

CLOSURE IN THE MUSIC
OF SCHOENBERG

by

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ABSTRACT

When listening to music, there is usually some expectation on the part of the listener that the piece will conclude in some way. This is particularly true of tonal music, which uses specific constructs as means of closure. Closure in post-tonal music is not nearly as specific, and listeners' expectations therefore are vary in their approaches to closure. To discount the possibility of closure, or to rely largely upon tonal constructs, is to place limitations on how we think of post-tonal music, and our further understanding could be hampered without exploring the unique ways closure is achieved in this music. Consequently, this thesis focuses exclusively on closure.

This thesis focuses on identifying four types of closure and describes how they work in post-tonal music: ternary, mirror, set, and pattern closure. As Arnold Schoenberg is one of the innovators of post-tonal composition, the examples focus largely on his works, particularly those composed with the twelve-tone technique. After presenting moments of closure through tonal and post-tonal music, I focus on Schoenberg's Concerto for Violin to demonstrate how these closing gestures interact to create closure.

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CHAPTER 1: INTRODUCTION TO CLOSURE

It is widely understood that closure in post-tonal music and closure in tonal music are achieved by substantially different means. Music theorists who have written about the subject either disagree on exactly what those means are or address varying types of post-tonal closure. For some, closure in post-tonal music is achieved by way of analogy or specific reference to tonal structures. For others, it is achieved by means unique to post-tonal music. For others still, closure is nearly impossible in post-tonal music. What follows below is an introduction to various conceptions of closure.

Michael Cherlin's views on closure are seen largely as being modeled on tonal constructs. He states, "In the early twentieth century, Arnold Schoenberg begins to imagine music where internal conflict is not resolved, and where closure in 'perfection' instead of being the only possibility becomes an impossibility."¹ Cherlin describes post-tonal music as being in a state of constant conflict with no resolution and as being "imperfect." By imperfection, he means the "impossibility of reaching a final state of being, or that imperfection asserts the impossibility of perfection,"² and suggests that "perfection is not redefined by Schoenberg's music, it is abandoned."³

Others view closure in a different manner. Richard Kurth, for example, describes closure in post-tonal music with reference to tonal music. He argues that Schoenberg often withheld tonal elements until moments of closure through a process that Schoenberg called "suspended

¹ Michael Cherlin, *Schoenberg's Musical Imagination*. (Cambridge: Cambridge University Press, 2007), 2.

² *Ibid.*, 8.

³ *Ibid.*, 7.

tonality.”⁴ Kurth asserts that the post-tonal methods of composition used by Schoenberg were originally a method for suspending tonality and contends that as Schoenberg’s compositional methods matured into serialism, his style led to “emancipating tonality,” leaving only moments that Kurth calls “tonal ‘potency’ or ‘latency’.”⁵ He states that tonality is still present and has some potency, but it reveals itself only in moments of closure.

Kurth consistently describes closure in Schoenberg’s music using tonal analogies. For example, Kurth describes how boundary events contribute to the closure in an individual phrase.⁶ His interpretation of closure in the prelude movement of Schoenberg’s *Suite for Piano, Op. 25*, starts by relating row form P0 to the tonic and P6 to the dominant in the opening three measures.⁷ He describes this passage as being canonic in nature; the last pitch of P0 is the starting pitch of P6, which is “analogous to closing an imitative phrase on the dominant.”⁸ Kurth seems to understand closure as the ending of phrases, and phrase structure in post-tonal music is to be understood largely by analogy with phrase structure in tonal music.

David Lewin’s discussion of Milton Babbitt’s *Composition for Four Instruments* reveals some of his ideas on closure. Lewin points out that the four instruments can be used to create 16 unique combinations of instruments. Babbitt uses 15 of these combinations to create 15 unique sections in his composition. For example, only the clarinet plays in the first section while section two excludes the clarinet and uses the remaining three instruments: flute, violin, and cello. The

⁴ Richard Kurth, “Moments of Closure: Thoughts on the Suspension of Tonality in Schoenbergs’ Fourth Quartet and Trio.” In *Music of My Future: The Schoenberg Quartets and Trio*, edited by Reinhold Brinkmann and Christoph Wolff, 139-60. (Cambridge, MA: Harvard University Press, 2000), 140. Schoenberg’s use of “suspended tonality” is in Arnold Schoenberg, *Theory of Harmony*. Translated by Roy E. Carter. (Berkeley: University of California Press, 1978), 384.

⁵ Kurth, “Moments of Closure,” 142.

⁶ Richard Kurth, “Mosaic Polyphony: Formal Balance, Imbalance, and Phrase Formation in the Prelude of Schoenberg’s *Suite, Op. 25*.” *Music Theory Spectrum* 14, no. 2 (1992): 188-208.

⁷ *Ibid.*, 189-90.

⁸ *Ibid.*, 190.

one combination Babbitt does not use would have all four instruments tacit. According to Lewin, in order to achieve “balance, completion, and closure,” this hypothetical 16th section with all instruments tacit would need to be included after section 15, which has all four instruments playing.⁹ With the 16th section present, all unique instrumental combinations would be used, and every section would have a complementary partner. For example, if exactly one instrument is used in a particular section, the remaining three would be found in the complementary partner.

Elsewhere, Lewin also discusses the creation of “generative lusts” as a means of creating “tensions and/or potentialities which later events of the piece will resolve and/or realize to greater or lesser extents.”¹⁰ One way a generative lust is brought about is through the creation of an incomplete or imperfect transformation. Lust, or longing, for the complete transformation arises as a result. Closure can occur when the later events complete the transformation fully, thus satisfying the lust brought about by the incomplete transformation.



Example 1.1. Potential Generative Lust in Two Trichords

Example 1.1 displays two trichords, which, being different, may establish a kind of conflict requiring later resolution. The B and D in the second trichord can be seen as a simple pitch transposition of +9 from D and F respectively, while the third tone “should” be E, not, C,

⁹ David Lewin, “Generalized Interval Systems for Babbitt's Lists, and for Schoenberg's String Trio.” *Music Theory Spectrum* 17, no. 1 (1995), 85-86, 96.

¹⁰ David Lewin, “Transformational Techniques in Atonal and Other Music Theories.” *Perspectives of New Music* 21, no. 1-2 (1982-83): 341.

under the same operation. This imperfect transposition of the set creates a lust, or a call for closure, satisfied only by a later occurrence of a complete transposition of all three notes in the trichord.

Brian Alegant views closure as being brought about by the significant return of material used earlier in a given work. He discusses two types of closure that can result from such a return, calling these “collectional closure” and “textural closure” and offering examples of each from Schoenberg’s Op. 33b.¹¹ By collectional closure, Alegant means the significant return of an opening collection or collections of pitch classes. In his example, the collections of pitch classes are the tetrachords used as the theme. These tetrachords return at exact pitch during the recapitulation of the sonata form to give the listener a sense of closure. By textural closure, Alegant means the significant return of textures. In his example, textural closure is brought about when the coda “regains the single-line texture and clear exposition of long-note tetrachords of the opening.”¹² In each case, some aspect from the beginning of the piece returns with enough significance to establish a sense of closure.

Robert Hopkins identifies closure as “the sense of satisfactory conclusion that comes with the anticipated arrival at a state of comparative repose following tension or activity.”¹³ He states that the parameters of “registral pitch, concordance, dynamics, duration, [and] timbre” are the primary components that can create a sense of closure in post-tonal music.¹⁴ For example, a melody that rises in pitch may be brought to a satisfactory conclusion by falling right back to its original pitch. Closure is understood because the starting pitch represents the anticipated arrival

¹¹ Brian Alegant. “Unveiling Schoenberg’s op. 33b.” *Music Theory Spectrum* 18, no. 2 (1996):153-154.

¹² *Ibid.*, 183.

¹³ Robert Hopkins. *Closure and Mahler’s Music: The Role of Secondary Parameters*. (Philadelphia: University of Pennsylvania Press, 1990), 4.

¹⁴ *Ibid.*, 29.

that follows a period of activity, which in this case is the ascent and motion away from the starting pitch.

These differing views of closure in post-tonal music can be distilled to three general schools of thought: (1) closure as the domain of tonal music, with little room for post-tonal music (Cherlin); (2) closure appearing in post-tonal music as specific tonal reference points (Kurth); and (3) closure operating in post-tonal music in its own ways, such as pattern completion (Lewin), recapitulation (Alegant), and repose after activity (Kurth).

While these theorists only touched upon the subject of closure tangentially, in the service of other areas of analysis, some evident weaknesses remain. To discount the possibility of closure, or to rely largely upon tonal models, is to place limitations on how we think of post-tonal music, and our understanding of it could be hampered without an exploration of the unique ways closure is achieved in this music. Consequently, this thesis focuses exclusively on closure, expanding on some of these scholars' work. Because Schoenberg introduced many of the techniques used in post-tonal music, the examples throughout this thesis will focus mostly on his music. Through analysis of his compositions, I have found that closure is achieved in his music through traditional tonal means as well as means totally unique to post-tonal music.

CHAPTER 2: TYPES OF CLOSURE

The term closure is not just a musical term. Therefore some presentation of its varying definitions may be useful. Closure is a term used in psychology to define the end of a period of prolonged emotional stress. Other art forms besides music also have elements of closure, which are likely to be comparable to closure in music. The following definitions of closure by Barbara Herrnstein Smith and Noel Carroll demonstrate the similarities between music and poetry:

“The principles of poetic and musical structure are comparable insofar as both forms of art produce experiences which occur over a period of time and are continuously modified by successive events.”¹⁵

“The notion of closure refers to the sense of finality with which a piece of music, a poem, or a story concludes. It is the impression that exactly the point where the work does end is just the right point. To have gone beyond that point would have been an error. It would have been to have gone too far. But to have stopped before that point would also be to have committed a mistake. It would be too abrupt. Closure is a matter of concluding rather than merely stopping or ceasing or coming to a halt or crashing. When an artist effects closure, then we feel that there is nothing remaining for her to do. There is nothing left to be done that hasn't already been discharged. Closure yields a feeling of completeness.”¹⁶

In the first quote, Barbara Herrnstein Smith may not have stated what closure is, but she gives us the general manner in which closure operates in poetry and music. In the second quote, Noel Carroll notes that closure brings completion to a form. Hopkins' definition presented

¹⁵ Smith, Barbara Herrnstein. *Poetic Closure: A Study of How Poems End*. Chicago: University of Chicago Press, 1968: 4.

¹⁶ Carroll, Noel. “Narrative Closure.” *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* 135, no. 1 (2007): 2.

earlier as a state of rest or repose following a period of tension or activity¹⁷ is consistent with these two quotes. Two important factors in these definitions are time and change. Change takes place when tension or activity is followed in time by a state of comparative repose.

These ideas suggest some standard conditions for defining closure. However, in the analysis of music, one encounters a variety of forms, of varying degrees of complexity. Therefore, various specific types of closure must be considered. This chapter will discuss four types of closure as well as the potential relationships between types of closure, as follows:

- I. Ternary (ABA) Closure
- II. Mirror (A ∇) Closure
 - a. Balanced Closure
 - b. Diametric Closure
- III. Set Closure
- IV. Pattern Closure
- V. Relations Between Types of Closure

I. Ternary (ABA) Closure

“Significant” repetition, defined below, is one way to achieve closure, and the simplest possible form that involves significant repetition is *ternary closure*, or ABA. Ternary closure is

¹⁷ Hopkins, Robert. *Closure and Mahler's Music: The Role of Secondary Parameters*. (Philadelphia: University of Pennsylvania Press, 1990), 4.

a very familiar form in music and, according to Heinrich Schenker, “seems to be the only three-part form applicable to music.”¹⁸

If an event evoking a state of tension is followed by an event evoking a state of rest, change has taken place, and change is indicative of closure, as proposed by Hopkins. Assuming that the series of events did not begin in a state of heightened stress, some other event must have led to that state. This notion suggests that a piece (or section) of music must begin in a state of rest. In an abstract sense, for the sake of example, this initial state of rest (usually an initial statement or expository idea) will be described as event “A,” which alone cannot represent closure. There is no meaning to A other than, perhaps, the preconceived notions one may have about A.¹⁹ In order for A to be defined, repetition is required. Schenker notes something similar:

“Only by repetition can a series of tones be characterized as something definite. Only repetition can demarcate a series of tones and its purpose. Repetition thus is the basis of music as an art. It creates musical form, just as the association of ideas from a pattern in nature creates the other forms of art.”²⁰

As repetition is necessary for closure within this context, one possible course of action for a composer is to repeat A. While immediate repetition of A can clarify A’s boundaries and add strength to its status as a discrete event and as a significant part of the form, this repetition does not progress towards a sense of closure. There has been no event dissimilar from A; therefore A can still be treated as a single element without the necessary events for a complete,

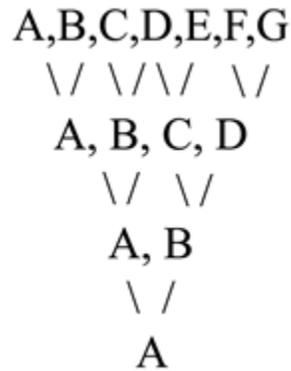
¹⁸ Schenker, Heinrich. *Harmony*. Edited by Oswald Joans. Translated by Elisabeth Mann Borgese, Chicago: University of Chicago Press, 1954: 10.

¹⁹ Preconceived notions will be addressed later.

²⁰ Schenker, Heinrich. *Harmony*. Edited by Oswald Jonas. Translated by Elisabeth Mann Borgese. Chicago: University of Chicago Press, 1954: 5.

coherent structure. Continued repetition of A may, in fact, establish an ostinato effect. In creating an ostinato, no signs or clues are given to anticipate closure. For example, a string of repetitions of an initial event (A,A,A,A,A,A,A,A,A....) offers no inherent way to anticipate closure.

For progression towards closure to take place, a distinctly separate event must occur, which one may label “B.” While “B” indicates a change from A, without any repetition present B could still be considered as part of a larger “A” as considered in Example 2.1.



Example 2.1. Lack of repetition = A

Continuous change may ultimately mean, at the largest scale, that no change has occurred at all. No indication is made that there is an end in the foreseeable future; repetition is necessary to stop change. As noted above, the repeated event must not recur immediately. Therefore an intervening event must take place. To distinguish between immediate repetition and repetition that occurs after an intervening event, I will call the latter *significant repetition*.

B does not need to be different from A in every possible way. Moreover, if B changes too much it may prohibit the cohesiveness of form. For example, the very simple and well-

known song, “Twinkle, Twinkle, Little Star,” has an ABA form. The B section has some similarities to the A section. It follows the exact same rhythm and has a similar descending motivic figure as the second half of A. Had B been completely different from A, the strength and coherence of the form would have been compromised. To achieve a balance, there must be enough change to keep the piece interesting but leaving enough similarities to still keep it from being too complex and disjointed.

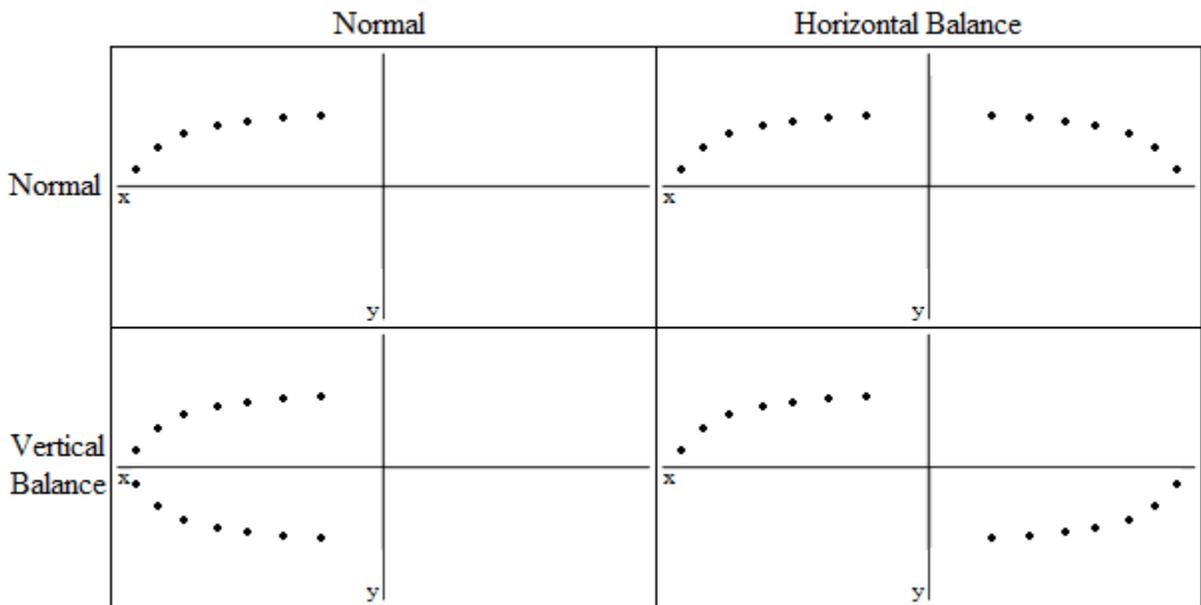
This example also illustrates the primary difference between the first A and the second one. Even though both events in the ABA form are alike in every single way, the aesthetic effect is quite different because of the insertion of B. The first A represents the state of rest, while B represents the state of unrest. In this case, B remains similar enough to A to remind us of the state of rest without actually being in a state of rest. This action creates a longing or anticipation for that state of rest. The resolution and return to “home” is strengthened by how much B can create anticipation. That resolution and sense of closure is the aesthetic experience that can only be associated with significant return.

II. Mirror ($A\forall$) Closure

One of the closure types can be achieved by two distinctly different means. Mirror closure involves two subtypes of closure: *balanced* and *diametric closure*. Balanced closure occurs when some definable attribute of an event can be added to that of another event to achieve a sum of zero for that attribute. Example 2.2 is a visual representation of some of the possible ways balanced closure manifests itself.

The upper-left graph represents an event. If that event is flipped vertically, the addition of the original event to its vertically flipped self would mean that the sum of all y values would

be zero, as demonstrated in the lower-left graph, and functions as a state of rest. The same would hold true for horizontal balance as demonstrated in the upper-right graph in the example, with the exception that the sum of all x values rather than all y values would be zero. The lower-right graph invokes both vertical balance and horizontal balance in which the sum of all values of x and all values of y would be zero. A simple idea using a musical context would be C-D-E being balanced by C-Bb-Ab. If C is represented as 0, then 0,+2,+4 is balanced by 0,-2,-4.



Example 2.2. Examples of Balanced Closure

Similar to balanced closure is diametric closure, which is also composed of two events that are related to one another. As the name suggests, this is closure in which the two events are opposites. This principle of opposites resembles that of antonyms such as yes/no, good/bad, and pretty/ugly. This form of closure appears to be a more general type of closure than balanced closure because it includes changes that are not as easy to quantify with exact values and includes examples such as a high passage followed by a low passage or loud dynamics followed

by soft dynamics. Basically, the two events are different in a particular domain but are diametric to one another.

Both balanced closure and diametric closure meet the criteria for closure requiring change and repetition. Repetition occurs when a second event is recognizable as related to a first but functions in an exactly opposite manner.

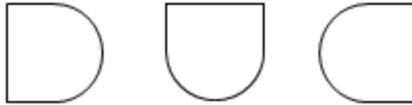
III. Set Closure.

The next type of closure, *set closure*, requires some prior knowledge on the part of the observer. The set <A, B, C, D, E, F, G> presented in Example 2.1 does not have significant repetition, but with additional knowledge one could discern whether the pattern either leads to closure or whether it is already closed. For example, one might recognize the pattern as the letters of the English alphabet in order. One assumption might be that this pattern would continue until all letters of the alphabet have been presented in order and that this pattern is not yet complete. A musician, on the other hand, might view this structure as being complete, because it comprises the seven symbols used in common musical notation for the “natural” pitch classes. External circumstances could determine what prior knowledge will be used, such as whether the person is present in a music theory class or an English class.

One variant of set closure that actually creates a stronger degree of closure includes the return of the first element of the set, which in Example 2.1 is element “A.” This variant resembles ABA in certain respects and will be called *circular set closure*.

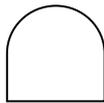
IV. Pattern Closure

One does not always to have prior knowledge to recognize closure. In *pattern closure*, an event can remain largely unchanged through repetition while one facet of that event changes, creating a discernible pattern. One such example is illustrated in Example 2.3.



Example 2.3. Incomplete Pattern

One may not know what the events in this example represent or what they mean, but the example clearly is composed of one shape that follows a discernible pattern, rotating 90° clockwise in each step. Given this 90° rotation, there will be exactly three variants based upon the first event. If there is to be a fourth and last event it would be the shape in Example 2.4, determined simply by completing the pattern:



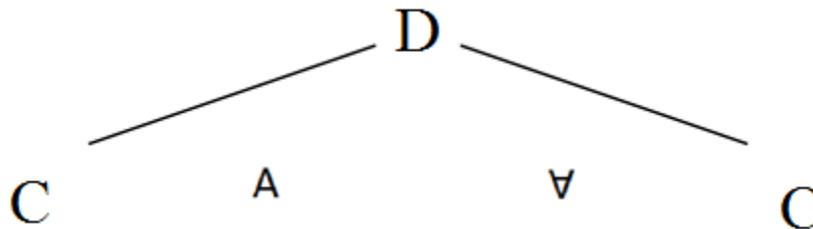
Example 2.4. Last Event to Complete Pattern

When one understands the pattern used in Example 2.3 and can anticipate its completion, the shape in Example 2.4 brings a sense of closure. As with set closure, it is possible to continue the pattern to include a repetition of the first event to create a stronger sense of closure, and this phenomenon is called *circular pattern closure*. A slightly long example of this would be a figure

that is repeated through the circle of fifths. If this figure starts on C and continues through all transpositions to F then there is pattern closure. If the figure is then repeated on C at the end, it would result in circular pattern closure.

V. Relations Between Types of Closure

While these four types of closure – ternary, mirror, set, and pattern closure – describe ways in which closure takes place, a single piece of music is often more complex and may contain more than one type of closure. Multiple closures based on the same or different events could occur at the same time, such as the combination of ternary (ABA) and mirror (A ∇) simultaneously in Example 2.5.



Example 2.5. Simultaneous Forms

In this example, C-D-C is the pitch-class structure and A ∇ represents the intervals between pitch classes. Thus, both ternary closure and mirror closure are present. Ternary closure is brought about by the repeat of pitch-class C after D, and mirror (balanced) closure is brought about by the directed interval 10 (D to C), which complements 2 (C to D). In this manner both forms are presented simultaneously.

So far, these types of closure have been limited to abstract examples. The next three chapters will discuss how these types of closure function in musical examples from the literature.

CHAPTER 3: TONAL MUSIC AND CLOSURE

The complexities of post-tonal music pose certain challenges to the composer trying to achieve closure. One of the biggest challenges is the variety of pitch combinations and their possible relationships. For example, the possible number of trichords (equivalent within transposition and inversion) is twelve. Considering the relationship between those trichords significantly increases the total number of compositional possibilities. In contrast, tonal music has four standard triads and a limited number of available relationships based upon established rules and conventions. In tonal music's most basic form of closure, the tonic is followed by the dominant, which in turn is followed by the tonic. This tonic-dominant-tonic progression is recognized across tonal compositions as a standard type of closure. There is no pre-existing construct or type of idiomatic gesture that sets a similar standard for post-tonal compositions. Without idiomatic closing gestures such as those used in tonal music, post-tonal music must rely on other perceivable patterns that demonstrate some type of closure.

Tonal music has had many years to cultivate a set of conventions and principles that would apply to most compositions. Listeners of tonal music tend to have a prescribed set of expectations allowing educated guesses about what should happen next. These expectations are particularly true in the case of cadences and closure. As music became more chromatic, these cadential gestures became less relevant, and the elements that cropped up in their place show how other types of closure can occur.

Cadences are used in tonal music as a means of concluding phrases. Since cadences can conclude phrases, these cadences can also be used to conclude sections, movements, and pieces.

Cadences vary in strength, and the strongest cadence is typically reserved for the end of the piece. The last cadence is also usually longer than previous cadences in order to strengthen the degree of closure. The finale of Beethoven's "Eroica Symphony" is an example of this idea. The cadence at measure 435 (Example 3.1) is the first perfect authentic cadence at the end of the piece, followed by oscillations of V^7 and I chords through the end of the piece, comprising a total of 39 post-cadential measures. Additionally, the first orchestral chord of the first movement is almost identical to the last orchestral chord of the last movement, tying the symphony together as a whole.

Cadences have become standard musical structures to create the bulk of closing gestures within classical tonal music, and if not treated appropriately they can actually impede the strength of closure. For instance, a composition may be written where some other gesture rather than a standard cadential gesture is more appropriate for closure to happen. A standard cadence may, in fact, weaken the degree of closure, as happens in Leos Janacek's *Moravian Dances, II*. The dance is short enough to be presented below in its entirety as Example 3.2.

The last two measures show a fairly standard example of closure through conventional tonal means. Beat one of the penultimate measure starts with $ii^{\emptyset 7}$ followed by V^7 and concludes in the next measure on I. The bass is reinforced by doubling at the octave, while the uppermost voice is 1-7-1. These measures are a classic example of a perfect authentic cadence, which would be considered a strong example of closure typically used at the end of a piece.

Allegro con brio. $\text{♩} = 60$.

Musical score for the first movement of Beethoven's Symphony No. 3, measures 1-4. The score is in 3/4 time and E-flat major. It features a full orchestral texture with woodwinds, strings, and a piano. The first four measures are marked with a forte (*f*) dynamic. The piano enters in the fourth measure with a piano (*p*) dynamic. The score includes various musical notations such as stems, beams, and slurs.

Musical score for the fourth movement of Beethoven's Symphony No. 3, measures 472-475. The score is in 3/4 time and E-flat major. It features a full orchestral texture with woodwinds, strings, and a piano. The first four measures are marked with a forte (*f*) dynamic. The piano enters in the fourth measure with a piano (*p*) dynamic. The score includes various musical notations such as stems, beams, and slurs.

Example 3.1. Beethoven *Symphony No. 3*, 1st mvt. m. 1 and 4th mvt. m. 472

Moravian Dances

Mvt. II.

Leos Janacek

Con moto

Piano

f *p*

7

f

13

p poco a poco

19

cresc. *ff*

2

Moravian Dances

The image displays a musical score for the second movement of Janacek's *Moravian Dances*. The score is written for piano and is divided into four systems, each containing a grand staff (treble and bass clefs). The key signature is three flats (B-flat major or D-flat minor), and the time signature is 3/4. The first system (measures 25-30) features a dynamic of *ff* (fortissimo) in the right hand and *mf* (mezzo-forte) in the left hand. The second system (measures 31-36) includes a *cresc.* (crescendo) marking and a triplet of eighth notes in the right hand. The third system (measures 37-42) returns to a dynamic of *ff*. The fourth system (measures 43-48) concludes with a dynamic of *fz* (forzando) and a final cadence. The score includes various musical notations such as slurs, accents, and dynamic markings.

Example 3.2. Janacek, *Moravian Dances*, mvt. 2

The problem with closure arises when this cadence is compared with the rest of the composition: the cadence is only loosely related to the prior events. While change is necessary for closure, as noted in Chapter 2, significant return required for ternary closure is not realized in the last two measures. Rather than being based upon ABA as the means of closure, the composition uses an idiomatic gesture that merely suggests closure. The effect is actually a weaker conclusion due to the contrary ideas of the idiomatic cadential gesture to the rest of the piece.

The final cadence differs from the rest of the movement in its harmony, texture, range, harmonic rhythm, and melody. The progression of chords used in the last two measures also differs from earlier events in the music. The bass uses a pedal point throughout the entirety of the piece. The relatively stable bass means that the piece has no quick progressions except for those at the surface. The bass uses scale-degree 1 for twelve measures, scale-degree 5 for sixteen measures, a lowered scale-degree 6 for eight measures, and scale-degree 5 for another eight measures. On the other hand, harmony in the last three beats changes twice — sixteen times faster than any other example in the piece.

The first four measures do not change harmony at all and give only hints of other harmonies such as ii or IV through accented passing tones in the upper voices. The consequent phrase alternates between I and $ii^{06/4}$, $ii^{04/3}$, or iv^6 , and the majority of this piece reflects this type of alternating motion. The only measures that don't are the last two, the first place where three different chords are used in the same phrase.

The melody of the last two measures displays yet another way in which the last two measures differ from the rest of the piece. The melody moves from tonic to the leading tone then

returns to the tonic. This motion doesn't resemble any prior melodic figures and presents one more way in which the ending seems disconnected from the movement.

The consequence of this standard closing gesture that bears no resemblance to the rest of the piece is a disjointed effect. With no strong correlation to connect the last two measures to the rest of the movement, the strength of closure is undermined, even though the last two measures by themselves exemplify a typical cadence one would expect to close a piece of tonal music. Significant return is necessary for closure, and the addition of material similar to earlier events would help strengthen the effect of closure. The overall form of the piece, with respect to thematic material, is ABA, but the harmonic structure as outlined by the pedal tones suggests a one-part form. The last two measures are contrasting enough to make this already ambiguous form more ambiguous. The conclusion, while completely logical as a standard tonal structure, shows that these cadences lack the ability to conclude all music, and other means are necessary to describe closure.

One example of a piece of music that uses something other than cadential gestures for closure is Schumann's song "Im Wunderschönen Monat Mai," as presented in Example 3.3.

Schumann
Dichterliebe, Op. 48
Im wunderschönen Monat Mai
(Heine)
Op. 48, No. 1

Langsam, zart

p

p

Im wun - derschönen Mo.nat Mai, als

al - le Knos - pen spran - gen, da ist in mei - nem

Her - zen die Lie - be auf - ge - gan - gen.

ritard.

Im wun - derschönen Mo - nat
Mai, als al - le Vö - gel san - gen, da
hab' ich ihr ge - stan - den mein Seh - nen und Ver -
lan - gen.

ritard.

fz. *

Example 3.3. Schumann. *Dichterliebe*, “Im Wunderschönen Monat Mai.”

The song concludes on V⁷ of F# minor. In fact, there is no F# minor in the introduction or conclusion of the piece. Not only do these sections exclude any resolution to F# minor, but the conclusion on the V⁷ of F# minor is unstable and has a strong tendency to resolve to F#. The last note of the melody also ends on the raised seventh scale degree, E#, which, as the leading tone, has the strongest tendency of all possible scale degrees to resolve. The text also has no strong sense of resolution:

Im wunderschönen Monat Mai,
Als alle Knospen sprangen,
Da ist in meinem Herzen
Die Liebe aufgegangen.

In the wonderful month of May,
When all the buds were bursting open,
My love burst forth
From my heart.

Im wunderschönen Monat Mai,
Als alle Vögel sangen,
Da hab' ich ihr gestanden
Mein Sehnen und Verlangen.

In the wonderful month of May,
When all the birds were singing,
I confessed to her
My yearning and my longing.

Heinrich Heine

Schumann is doing everything he possibly can to leave the piece unresolved. He does this for two very good reasons: it should reflect the “longing” in the text, and it is only the first song in the cycle, so some type of continuation or anticipation is expected.

In spite of the lack of resolution, the song still maintains a sense of closure. It may not be tonally closed, but its sections can elicit closure through significant repetition. The five sections can be viewed as XYXYX in which the X represents the four-measure passage where the piano accompaniment is alone and the Y represents the passages where the singer is accompanied by the piano.

The last four measures of this song are very similar to the first four measures, and this brief idea is actually stated in the piece three times. The second statement provides a sense of

closure to the first verse and separates the first verse from the second verse but does not have the same significance of closure as do the last four measures.

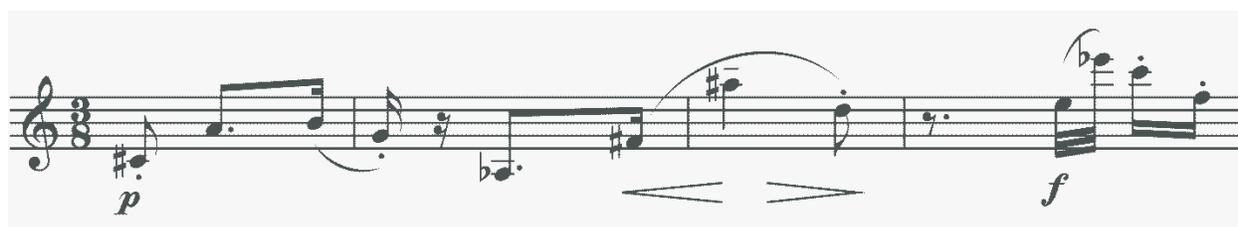
What gives the strength of closure for the last statement is the combination of the music and text. The second verse concludes with “yearning and longing.” This statement is immediately followed by the four-measure piano accompaniment in which no tonal resolution occurs, reinforcing the text. This unification of the voice and accompaniment, coupled with the significant return of the framing material, gives us a sense that the song has concluded.

As demonstrated in these two examples, important factors other than cadences can influence closure, even in tonal music. In music that is more chromatic, or even post-tonal, the cadential gestures of tonal music have given way, and the various other considerations may denote points of closure at multiple structural levels.

CHAPTER 4: MOMENTS OF CLOSURE IN THE MUSIC OF SCHOENBERG

In tonal music, a single cadence might represent small-scale closure (the phrase), large-scale closure (the section), or even closure of an entire piece. Similarly, the types of closure defined and discussed in Chapter 2 may help to demarcate large-scale sections in a work, but they also may provide moments of closure. This chapter examines some of Schoenberg's music and isolates some moments of closure found in small-scale structures.

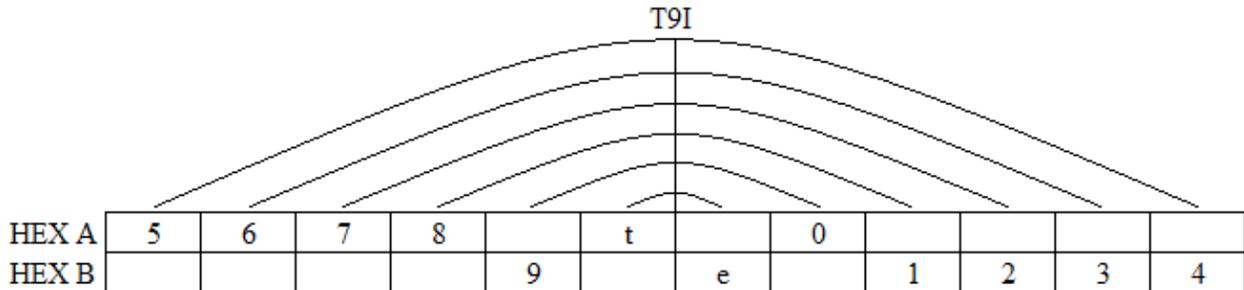
Hexachordal combinatoriality is an example of small-scale balanced closure. This property is evident when two forms of the same row combine such that the first hexachord from each row constitute an aggregate together, as do the second hexachords. Of the various combinations, the most obvious way for balance to occur is to use the retrograde form of the prime row, though the rows treated combinatorially by twelve-tone composers often are related by inversion.



Example 4.1. Schoenberg, *Five Piano Pieces*, no. 5, mm. 1-4

The first four measures of Schoenberg's *Five Piano Pieces*, no. 5 feature the row $\langle 0,8,T,6,7,5,9,1,3,2,E,4 \rangle$ and will be represented as $T0(S)$. The hexachord used in this particular row has the prime form (012357) and is I-combinatorial. This means that the first hexachord

“A” and the second hexachord “B” will map onto one another under some inversion. This inversion is T9I, as shown below in Example 4.2. This type of mapping also means that one of the subject’s combinatorial partners is T9I(S) as shown below in Example 4.3. The sum of every mapped pair of integers in Examples 4.2 and 4.3 is 9, thus letting T9I(S) bring balanced closure.



Example 4.2. Combinatoriality as Balance

T0(S)	0 8 T 6 7 5	9 1 3 2 E 4
T9I(S)	9 1 E 3 2 4	0 8 6 7 T 5

Example 4.3. I-combinatorial Rows

Balanced closure through combinatoriality can be brought about by the retrograde of the subject. This method works with any possible subject, unlike inversion. In the case of retrograde motion, the quantifiable balance is understood through the order position of the pitches. Using the same subject from Example 4.1, Example 4.4 presents the row and its retrograde and assigns an order number to each pitch class.

T0(S)	RT0(S)
0 8 T 6 7 5 9 1 3 2 E 4	4 E 2 3 1 9 5 7 6 T 8 0
1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12

Example 4.4. T0(S) and RT0(S) and Accompanying Order Numbers

In this figure, the sum of the order numbers of similar pitches all equal 13. Balanced closure is achieved through the pitch classes' order numbers to each other rather than the sum of the pitches themselves.

Additionally, if the horizontal axis represents the position of pitches and the vertical axis represents the actual pitches, then I-combinatoriality would be vertical balance and R-combinatoriality would be horizontal balance. Example 4.5 shows the transformations and the resulting type of balance associated with each transformation.

		Horizontal Balance	
		A	B
		T0(S)	
Vertical Balance	B	A	A
	T9I(S)		B
		RT9I(S)	

Example 4.5. Vertical and Horizontal Balance

The relative simplicity of balanced closure is ideal for closure at local levels or short pieces. Balanced closure functions similarly to any type of cadential gesture found in tonal music in that it primarily closes phrases.

Schoenberg's *Concerto for violin and Orchestra*, op. 36, to be discussed in more detail in the next chapter, provides another example of small-scale closure. One way pattern closure works in twelve tone music is through the completion of a cycle. A cycle is the repeated transposition of a collection of pitches or pitch classes at a consistent interval, until it returns or is about to return to its original position. Example 4.6 shows how a set (S) is transformed into

small section and the beginning of another, ultimately creating form, and highlighting certain moments of structural importance. In the following chapter, examples of these types of small-scale closure will be used to show how small-scale closure functions within larger works and large scale closure.

CHAPTER 5: CLOSURE IN SCHOENBERG'S OPUS 36

Schoenberg's twelve-tone works may not use standard tonal gestures, but they do exhibit some of the same types of closure discussed in Chapter 2. They also demonstrate that multiple types of closure can work together to reinforce large-scale structures and to provide a stronger degree of closure. Using Schoenberg's *Concerto for Violin and Orchestra*, op. 36, this chapter will apply the concepts of Chapter 2 and 4 to demonstrate how large-scale closure can occur in post-tonal music.

The first movement of the *Concerto for Violin and Orchestra* is in sonata-allegro form. Its sections are arranged as follows²¹:

Exposition:	Theme 1	Measure 1-41
	Transition	Measure 42-43
	Theme 2	Measure 45-92
Development:		Measure 93-161
Recapitulation:	Theme 1	Measure 162-204
	Theme 2	Measure 205-232
	Cadenza	Measure 233
	Coda	Measure 234-265

There is no introduction in this piece, and the opening eight-measure gesture is quite distinctive in its use of balanced closure. Example 5.1 contains the opening eight measure of the melody of Theme 1.

²¹ For another interpretation, see Andrew Mead, "Large-Scale Strategy in Arnold Schoenberg's Twelve-Tone Music." *Perspectives of New Music* 24, no. 1 (1986): 140. Mead's interpretation does not include the subsections of sonata form and refers instead to row forms.



Example 5.1. Schoenberg, *Concerto for Violin*, op. 36, 1st mvt, m. 1-8, Solo Violin

This opening solo violin passage displays many small-scale examples of balanced closure. Not only is the overall motion from A up to Db (+4) balanced by the overall motion from D down to Bb (-4), but also the three intervals in one motion balance the three in the other as seen in Example 5.2. In other words, the pitch contours are precisely opposite.



Example 5.2. Motion Between Pitches

A closer look at the two tetrachords shows that there are two common tones, Bb and Db. These two pitches, in addition to being common tones, are emphasized by agogic accents. As shown in Example 5.3, these two pairs of pitches are balanced not only by their opposing pitch contour (as in Example 5.2), but also by the reversed order positions of the two pitches.



Example 5.3. Balanced Structure of Agogic Accents

Schoenberg often exploits hexachordal combinatoriality in his twelve-tone works, and this movement provides many examples of this property. The two rows found in the melody and its accompaniment (not shown) in measures 1-8 are T0(S) and its hexachordal complement, T5I(S), which is presented immediately after T0(S) in measure 4. The letters A and B are assigned to the first and second hexachords, respectively, and treated as unordered collections. Example 5.4 displays their arrangement.

T0(S)		T5I(S)	
A	B	B	A

Example 5.4. Balanced Structure of Hexachords in Measures 1-8

The presentation of hexachords A and B in reverse order illustrates yet another example of balanced closure. While Examples 5.2, 5.3, and 5.4 may focus on different aspects of the same passage, all are examples of balanced closure in combinatoriality. The effect of closure is strengthened because of the simultaneous instances of balance, whether in a single voice (violin) or in melody and accompaniment together.

Immediately following this highly balanced structure is another example of a balanced structure where the same pair of row forms is stated in its entirety in the solo violin. The first row starts at the pickup to measure 9 as shown in Example 5.5.



Example 5.5. Schoenberg, *Concerto for Violin*, op. 36, 1st mvt, m. 8-14, Solo Violin

The first use of the full row, $T0(S) = \langle 0,1,6,2,7,9,3,4,T,E,5,8 \rangle$, is followed immediately by the I-combinatorial $T5I(S) = \langle 5,4,E,3,T,8,2,1,7,6,0,9 \rangle (A=0)$. These rows, as in the prior eight measures, produce a balanced structure common throughout the entirety of the 1st movement. I have compiled these moments of local balanced closure through combinatoriality in the Appendix. Most of these balanced statements are realized through inversion or retrograde motion following the initial statement of a row, but occasionally other factors are at play to create balance, such as simultaneous presentations of hexachordally combinatorial rows, thus eliminating the need for an antecedent-type phrase to create balance.

The transition from Theme 1 to Theme 2 is one where the two themes are related to one another in one manner but completely opposed in another.

Theme 1 features pitch classes $\langle 0,1,3,4 \rangle$, drawn from order positions 0,1,6, and 7 of $T0(S)$, thus highlighting in the violin the two (01) dyads. Schoenberg continues and expands this dyadic partitioning into Theme 2. Theme 2 consists of a duet between the brass and woodwinds based on hexachords derived from the row. The two themes are shown beside each other for comparison in Example 5.6.



Example 5.6. Comparison of Theme 1 (m. 1) and Theme 2 (m. 45)

T5I(S):

Order number	0	1	2	3	4	5	6	7	8	9	10	11
1st Partition	5	4		3			2	1			0	
2nd Partition			E		T	8			7	6		9

Example 5.7. Partitioning of the Row at Measure 45

Figure 5.7 shows the partitioning of the row used for measure 45. The first partitioning of the row yields a sequence of pitch classes with motion entirely in semitones (5-4-3-2-1-0), while the second partitioning has one note that breaks this continuity. (The 9 is “out of order.”) This partitioning is unique insofar as the passage has the maximum amount of conjunct motion available while maintaining the integrity of the row, which is in contrast to the smaller amount of conjunct motion used in Theme 1. Theme 1 features only a pair of dyads. Diametric closure (more qualitative than the quantitative balanced closure) is achieved when the near minimal use of conjunct motion used in Theme 1 is contrasted with the near maximal use of conjunct motion in Theme 2.

The time span between measures 1 and 45 is so large, that in order for the relationship between Themes 1 and 2 to be comprehended, intervening material that emphasizes this connection is required. Example 5.8 displays some of the intervening material, which connects the two themes.

The image shows a musical score for Example 5.8. It consists of five staves: Violin I (Vln. I), Oboe (Ob.), Violin II (Vln. II), and Viola (Vla.). The score is divided into several sections with measure numbers: 16, 18, 24, 38, and 41. The key signature is one flat (B-flat). The time signature is 4/4. The music features a gradual transition from Theme 1 to Theme 2, with chromatic trichordal segments and semitone dyads.

Example 5.8. Intervening Material Between Themes 1 and 2

The gradual transition from Theme 1 to Theme 2, which can be seen as an expansion of the former into the latter, starts in measure 16 with the addition of order number 3 to 1 and 0 in the solo violin as shown in Example 5.9. This expands the semitone dyads of Theme 1, $\langle 0,1 \rangle$, $\langle 3,4 \rangle$, $\langle 5,4 \rangle$, and $\langle 2,1 \rangle$, to include the chromatic trichordal segments $\langle 2,1,0 \rangle$ and $\langle 3,4,5 \rangle$. The

two trichords used in measures 16 and 19 (an I-combinatorial partner) include the exact pitch classes used in the melody for the first eight measures, further tying this idea of expansion to the beginning. Both are shown in Example 5.9 for comparison.

Measure	1-4	5-8	15-16	17-19
Pitches	T0(S) 0,1 3,4 6,7 T,8 2,9 E,5	T5I(S) 5,4 2,1 E,8 6,9 3,T 7,0	T0(S) 8,5,E,T 4, 2,1,0 7 6 9 3	T5I(S) 9,0,6,7 1, 3,4,5 T E 2 8
Order Number	0,1 6,7 2,4 8,E 3,5 9,T	0,1 6,7 2,5 9,E 3,4 8,T	E,T,9,8 7, 3,1,0 4 2 5 6	E,T,9,8 7, 3,1,0 4 2 6 5

Example 5.9. Measures 1-8 and 15-19 (discussed portions are in boldface)

The next chromatic expansion is shown in Example 5.10 at measure 24, where Schoenberg partitions the pair of rows into five sets each: 3 dyads and 2 triads. All but two of these sets are chromatic segments: $\langle 8,5 \rangle$, $\langle E,T \rangle$, $\langle 4,3 \rangle$, $\langle 9,7,6 \rangle$, and $\langle 2,1,0 \rangle$. Theme 2 also consists mostly of chromatic segments, and its two exceptions are similar in intervallic content to the two sets in this transition. In one case, the solo violin has the largest interval, interval-class 3, (see “0,9” in Example 5.10), which anticipates the last two pitch classes of the second partition of Theme 2 (see “6” and “9” in Example 5.7. The other exception is set $\langle 9,7,6 \rangle$, which reflects the same intervallic content of $\langle T,8,7 \rangle$ used in Theme 2. (See Examples 5.10 and 5.7, respectively.)

Measure	24-25	26-28
Pitches	T0(S) 8/5 E,T 2,1,0 4,3 9,7, 6	T5I(S) 0/9 1,2 3 T, E 6,7 8 4,5
Order Number	E/T 9,8 3,1,0 7,6 5,4, 2	T/E 7,6 3 4, 2 9,8 5 1,0

Example 5.10. Measures 24-28 (solo violin highlighted in boldface)

Pitches - E,0,2,3,4
Ordering - 9,0,3,6,7

Measure 38

Pitches - 0,1,3,4
Ordering - 0,1,6,7

Theme 1

Pitches - E,T,8,7,6,9
Ordering - 2,4,5,8,9,11

Theme 2, 2nd partition

Example 5.11. Comparison of Theme 1 and 2 to Measure 38

The five-note segment found in measure 38 presents the longest example so far that is clearly related to both themes. This segment, <E,0,2,3,4> reflects the pitch contour of Theme 1 and the inverted pitch-class contour of Theme 2. Example 5.11 shows these similarities. As seen in the above examples, Schoenberg has continuously expanded Theme 1, transforming it into

what will be Theme 2. While this transformation from Theme 1 into Theme 2 isn't necessary for the structure of closure, it does highlight the characteristics that are important to closure, and in that way, serves to strengthen the sense of closure.

One last example that establishes measure 45 as both a point of closure and the start of Theme 2 is found in the three measures leading up to that measure. Prior to measure 42, every row form is followed by its combinatorial partner. (See Appendix.) Both T0(S) and T5I(S) are present simultaneously in measure 42, creating a sort of vertical balance. This is markedly different from any previous pair of rows, all of which exhibited horizontal balance as the combinatorial partners were heard one after another. This sudden simultaneity (and lack of repetition) creates a sense of imbalance. In this way, Schoenberg creates a kind of acceleration or momentum from Theme 1 to Theme 2.

Pitch	m. 45	m. 46	m. 47
<i>T5I(S)</i>	5 4 3	2 1 0	9
	E T	8 7 6	
<i>T0(S)</i>	0, 1, 6, 2, 7, 9	3, 4, T, E, 5, 8	
	0, 1, 6	3, 4, T	
Order Number	7/2/9	E/5/8	
<i>T5I(S)</i>	0 1 3	6 7 T	E
	2 4	5 8 9	
<i>T0(S)</i>	0, 1, 2, 3, 4, 5	6, 7, 8, 9, T, E	
	0, 1, 2	6, 7, 8	
Order Number	4/3/5	9/T/E	

Example 5.12. Measure 45 (principal parts in boldface)

Measure 45 serves a dual purpose. It concludes the chromatic expansion and it begins Theme 2, functioning as an elision based on melodic content rather than harmonic content, as is

often the case in tonal music. The chromatic expansion within the row has reached its maximum potential as shown in Example 5.12 with the partitioning of the near fully chromatic hexachordal segments $\langle 5,4,3,2,1,0 \rangle$ and $\langle E,T,8,7,6,9 \rangle$.

As no other hexachordal partitioning will give more chromatic results without disturbing the integrity of the row, the progression or pattern is now complete. At the same time, Theme 2 introduces several new ideas: the appearance of two principal parts, significant changes in rhythm, and the addition of different row forms. The motive at the start of Theme 2 is used three times through a T4 cycle, exhausting all possibilities in that cycle. While that is grounds enough for local closure, this pattern closure is subordinate to the higher-level point of closure that follows. Schoenberg adds two measures that tie everything together. The opening motivic material that served as a central idea makes a significant return, invoking ternary closure. Theme 1 (A-section) is followed by Theme 2 (B-section), which is followed by a return to the central idea of Theme 1 (A).



Measure		51				52	
Pitches	<i>T3(S)</i>	4, 5	4	5, 7	8	7	8
		9, T	9	T, 6	E	6	E/2
		3, 0	3	0, 1	2	1	
	<i>T8I(S)</i>	7	6	4		3	
		2	E	5		9	
		8	1	T		0	
Order Number	<i>T3(S)</i>	1, 3	1	3, 7	T	7	T
		2, 4	2	4, 6	E	6	E/9
		0, 5	0	5, 8	9	8	
	<i>T8I(S)</i>	1	3	7		T	
		2	5	6		9	
		0	4	8		E	

Example 5.14. Pitch and Order Structures of Measures 51-52 (discussed portion is in boldface)

The pitch classes at these new order positions create the same interval pattern but are transposed consistently at T4. The motive, which previously was <0,1,3,4>, appears now as <4,5,7,8>, a pattern that might initially suggest the row form T4(S). This row form was, in fact, just used in the previous cycle of the 2nd theme (mm. 47-48), and its use here to close Theme 2 would seem to be a plausible option and certainly better than T3(S), which, up to this point, has never been used and has no obvious connection to any of the rows used. The surreptitious move to T3(S), disguised as T4(S), could be considered a form of deceptive closure.

The significant return of the beginning motivic material provides a strong degree of closure, but the deceptive nature of the theme and use of T3(S) and T8I(S) signify that this point of closure is not the last one - more is to come. For example, now that T3(S) has used the deceptive form of the motive from Theme 1, it is reasonable to expect that the motive will return under T3(S) in the original order positions. Another possibility would be that the motive appears

in an instance of T4(S) rather than deceptively under T3(S). Some type of resolution of this deception will bring closure.

Throughout the rest of the exposition no clear examples of closure appear except those of local balanced closure. The rest of the exposition develops ideas based on Theme 1. During the last three measures of the exposition, the number of times the row forms are used per measure increases, which is an indication of change, but not necessarily one of closure. While an intensification of elements can signify moments of change, it does not necessarily mean that the previous section has closed. It may merely have ceased for the time being, to be picked up either at a later time or not at all. Example 5.15 shows this intensification.

Pitches	90	91		92		
T5(S)	5,7,8,4	1,9,7	5,0,3	5,7,8,4	4,3,7,6	1,3,2,E
	E,2,3,T	3,0,E	E,9,T	E,2,3,1	T,8,0,E	T,8,7,6
	6,0,9,1	T,2,5	6,2,1	6,0,9,T	1,9,2,5	4,9,0,5
		4,8,6	7,8,4			
T10I(S)	E,7,8,T	8,6,2	0,3,T	9,1,6,5	2,0,1,4	5,0,3,9
	5,0,1,4	9,1,E	2,6,8	4,8,0,2	E,6,8,9	2,6,8,T
	2,6,3,9	4,3,5	5,7,4	T,3,7,E	5,7,3,T	4,9,0,5
		T,7,0	E,1,9			
Order Number						
T5(S)	0,3,6,9	E,7,3	0,4,8	0,3,6,9	9,8,3,1	E,8,5,2
	2,5,8,T	8,4,2	2,7,T	2,5,8,E	T,6,4,2	T,6,3,1
	1,4,7,E	T,5,0	1,5,E	1,4,7,T	E,7,5,0	9,7,4,0
		9,6,1	3,6,9			
T10I(S)	9,6,3,0	0,4,8	8,4,0	1,5,7,T	9,8,3,1	T,8,4,1
	T,8,5,2	2,7,T	E,7,3	2,3,8,E	T,6,4,2	E,7,3,0
	E,7,4,1	1,5,E	T,6,2	0,4,6,9	E,7,5,0	9,6,5,2
		3,6,9	9,5,1			

Example 5.15. Measures 90-92

The development section has no real important moments of closure. After all, such sections are developmental, not expository, in nature. However, it sets up several important patterns left temporarily unresolved, setting up stronger moments of closure reserved for the recapitulation. The development begins in measure 93, using a different melody, rhythm, and meter from the exposition, but remaining connected through the continued use of pitch materials from the exposition, such as the use of the first theme in a subordinate manner or the use of cycles. The use of those elements in the development section strengthens the degree of connection with the exposition and ultimately, the recapitulation and its closure.

The development has its own partitioning where order numbers (0,2,3,5), (6,8,9,11), and (1,4,7,10) are used. The pitches associated with these order numbers are shown in Example 5.16.

T8(S):																	
Pitches	<table style="border-collapse: collapse; width: 100%;"> <tr> <td style="border-right: 1px solid black; padding: 2px 10px;">8</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">T</td> <td style="border-right: 1px solid black; padding: 2px 10px;">5</td> <td style="padding: 2px 10px;">E</td> <td style="padding: 2px 10px;">6</td> <td style="padding: 2px 10px;">7</td> <td style="padding: 2px 10px;">4</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 10px;">9</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">0</td> <td style="border-right: 1px solid black; padding: 2px 10px;">1</td> <td colspan="4"></td> </tr> </table>	8	2	T	5	E	6	7	4	9	3	0	1				
8	2	T	5	E	6	7	4										
9	3	0	1														
T11(S):																	
Pitches	<table style="border-collapse: collapse; width: 100%;"> <tr> <td style="border-right: 1px solid black; padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">7</td> <td style="padding: 2px 10px;">E</td> <td style="border-right: 1px solid black; padding: 2px 10px;">4</td> <td style="padding: 2px 10px;">T</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">5</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 10px;">0</td> <td style="padding: 2px 10px;">6</td> <td style="padding: 2px 10px;">9</td> <td style="border-right: 1px solid black; padding: 2px 10px;">8</td> <td colspan="4"></td> </tr> </table>	1	7	E	4	T	3	2	5	0	6	9	8				
1	7	E	4	T	3	2	5										
0	6	9	8														
Order Number	<table style="border-collapse: collapse; width: 100%;"> <tr> <td style="border-right: 1px solid black; padding: 2px 10px;">0</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">3</td> <td style="border-right: 1px solid black; padding: 2px 10px;">5</td> <td style="padding: 2px 10px;">6</td> <td style="padding: 2px 10px;">8</td> <td style="padding: 2px 10px;">9</td> <td style="padding: 2px 10px;">E</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">4</td> <td style="padding: 2px 10px;">7</td> <td style="border-right: 1px solid black; padding: 2px 10px;">T</td> <td colspan="4"></td> </tr> </table>	0	2	3	5	6	8	9	E	1	4	7	T				
0	2	3	5	6	8	9	E										
1	4	7	T														

Example 5.16. Partitioning of the Row used in the Development

There are several different ways in which the development is related to the exposition. The use of Theme 1 appears in several different variations throughout the development section

and gives a sense of progression. In each of the three row forms used during the development, T8(S), T4(S), and T7(S), Theme 1 gradually assumes a more important role.

Two voices of the accompaniment at measure 93 are shown in Example 5.17. The opening of the development section here contains hints of Theme 1 found within this accompaniment. This can be seen in a comparison of measures 93-94 and measures 1 and 5. (See Examples 5.17 and 5.18.) The relationship between these measures is clear; both examples include a pickup, but the motion to the second pitch occurs on the downbeat of the next measure in Example 5.17, rather than a half-beat prior as in Example 5.18. The four notes in measures 1 and 5 constitute the same set class as those in measure 93 and 94 do: (0145). The set in the exposition (Example 5.18), if inverted about the A/Bb axis, produces the set in the development's accompaniment (Example 5.17). The accompanimental figure is different also in that it uses order numbers 10 and 7 rather than 0 and 1, reminiscent of the deceptive closure in Theme 2. In this manner, the connection to Theme 1 remains without having the passage being considered a return of the exposition.



Example 5.17. Measures 93-94 (accompaniment)



Example 5.18. Measures 1 and 5

At measure 119, the progression to T4(S) from T8(S) is significant. Just as Theme 2 started with T0(S) and moved through T4(S) and T8(S), the development moves from T8(S) to T4(S). It does not finish with T0(S) as that is left for a later point when a more complete closure would be more appropriate. This move is important because it reintroduces Theme 1 with its original order numbers, although it refrains from using the exact pitches and rhythm. See Example 5.19.



119

T4(S)	Pitch:	4,	5,	7,	8
	Order:	0,	1,	6,	7

Example 5.19. Measure 119

The final row forms used in the development section are T7(S) and its hexachordal combinatorial partner, T0I(S). Measures 145-152 use the motive of Theme 1 as the principal material in the solo violin's part. The pitches and order numbers are presented in Example 5.20.



Pitches	T7(S)	8	7			T	E		
Order Number		1	0			6	7		
Pitches	T0I(S)			E	0			9	8
Order Number				1	0			6	7

Example 5.20. Principal Pitches in Measures 145-152

This passage is the most literal use of Theme 1 as well as its last use before the recapitulation. It is different enough from the actual theme not to be considered a return, most notably in the rhythm. Much in the same way that Theme 1 expands gradually into Theme 2, the successive uses of the Theme 1 material gradually lead to a full return of Theme 1, eliciting the same sense of having both closure and the beginning of something new.

The recapitulation starts at measure 162, presenting Theme 1 with T8I(S) embedded within T3(S) as shown in Example 5.21. This statement of the motive from Theme 1 remains similar enough to measure 1 to evoke a sense of return and is the beginning of the end of the large-scale ternary closure. All of the aspects of rhythm, balance, agogic accents, etc. remain true to measures 1-8. The only difference is the embedding of the inverted row. Closure results from using T3(S) as the return, as this statement serves to answer the deceptive statement of T3(S) with the correct use (i.e., original order positions) of the motive from Theme 1 to allow a sense of closure.



Pitch	T3(S)	3	4					6	7
Order Number		0	1					6	7
Pitch	T8I(S)			8	7	5	4		
Order Number				0	1	6	7		

Example 5.21. Measures 162-66

Using T3(S) immediately after T7(S) resembles the movement from T8(S) to T4(S) found in the development. Pattern closure, used in Theme 2, is again being invoked. As the pattern of T8(S) to T4(S) would lead to T0(S), there is also a pattern of T7(S) going to T3(S) and onto T11(S), creating yet another example of pattern closure to be achieved via interval cycles. As the cycle starting on T7(S) is not as fundamentally important as the cycle starting on T8(S), it leads not to the original T0(S), but to T11(S), a near miss, the T7(S) cycle finishes first. Reinforcing its connection to the T-cycle, T3(S) is brought back at the start of the cadenza (after other intervening row forms), and then T11(S) occurs immediately following another section of T3(S). The completion of the other cycle, which started on T8(S) occurs at measure 242. Example 5.22 shows the two examples of cyclic closure and the order in which the row forms appear.

Measure	1st Cycle	2nd Cycle
93	T8(S)	
119	T4(S)	
138		T7(S)
162		T3(S)
233		[T3(S)]
		T11(S)
242	T0(S)	

Example 5.22. Pattern Closure Based on Cycles

The final full use of theme 1 starts on the pickup to measure 250 at T0(S) as shown in Example 5.23. This statement, heard in the coda, more closely resembles the original theme than any other examples presented. The closer to the original a statement happens to be, the stronger the sense of connection and sense of closure. Upon arrival at measure 263, all of the patterns

that Schoenberg has chosen to complete have largely been completed and the conclusion of the piece is expected.



Example 5.23, Measures 250-252 (solo violin)



Example 5.24, Measures 263-265 (solo violin)

Measure 263 uses one last portion from the motive from Theme 1 and is shown in Example 5.24. This statement remains unique among all of the examples of closure; it is the last phrase of the movement and only contains the first two notes of the opening theme. It has no discernible connections to the completion of a previously unresolved pattern, but the relationship to earlier examples is certainly undeniable. Up to this point, the 1st theme has been used frequently, often at points of closure. Schoenberg uses this motive from Theme 1 quite extensively in several ways; to close Theme 2 in the exposition, to increase its role in the development in preparation for its return, to start the recapitulation, and again to close the piece at measure 250 with the most similar repetition to its first use in Measure 1. Such frequent use of Theme 1 at moments of closure lends the statement a feeling of stability, or at least centricity, not unlike the centricity of a tonic triad. This use of the first two notes of the motive from Theme 1 seems to invoke closure in the passage even when formal elements that lead to a sense

of closure are absent. This simple motivic idea is given meaning through its repeated use in examples of closure, and once the motive is saturated with this meaning it can evoke a sense of closure without the structural trappings or even the specific types proposed in this thesis.

Because of their role throughout the piece, just two notes can embody closure all by themselves.

Throughout this chapter, various types of closure have been shown to work in conjunction one with another. Discerning the various levels at which closure is at work not only helps to sectionalize large movements, but also allows one to appreciate fully the many ways different types of closure are evoked.

CHAPTER 6: CONCLUSION

Ternary (ABA) closure, mirror ($A\forall$) closure, set closure, and pattern closure are four types of closure evident in twelve-tone music.

Ternary closure and mirror closure, represented by the forms ABA and $A\forall$ respectively, are two types of closure that arise under the basic conditions for closure, namely time and change. The A in both patterns returns while some change is included. In the case of ABA, the intervening element B separates the repetition of A, allowing significant return to take place. The repetition and change in $A\forall$ occur simultaneously; the second element is different from A, but is recognizable as coming from A.

Mirror closure is divided into two subcategories: balanced and diametric closure. Balanced closure is based upon the symmetrical display of an idea, whether vertically or horizontally. Diametric closure is based upon opposing notions such as high and low or fast and slow.

Set closure is missing some of the basic criteria for closure because it is contingent upon prior knowledge necessary for the observation of closure. For set closure to occur the set in question must be known and closure is understood based upon the fulfillment of all elements of the set. Pattern closure is the completion of a recognizable pattern. The elements within that pattern don't necessarily need to be known prior to observation. One example of pattern completion in twelve-tone music is through the use of cycles.

While these methods have been examined using twelve-tone music, these ideas could very well be applied to other styles of music, and indeed some are already commonly found in

the forms of music, such as ternary (ABA) closure. The recapitulation in a ternary form is a common type of closure, largely because the anticipation derived from B creates stronger degrees of tension and repose.

Other types of closure aren't as likely to be as prominent in other musical styles as ternary closure. Tonal music seems largely to be interpreted using ternary closure. Even if the large-scale form of a tonal piece of music may have some form other than ABA, the fundamental nature of I-V-I within tonal music ties the harmonic progression to ternary closure. Therefore, balanced, set, and pattern closure seem to be rare within tonal music and if used, it would be overshadowed by the fundamental nature of tonal music. For example, Johann Sebastian Bach's Invention I demonstrates aspects of balance as shown in Figure 6.1. The opening eight-note figure in measure 1 is balanced by the eight-note figure in measure 9 as shown in Example 6.2.



Example 6.1. Bach's Invention I, measures 1 and 9

C	D	E	F	D	E	C	G
+1	+1	+1	-2	+1	-2	+4	
G	F	E	D	F	E	G	F
-1	-1	-1	+2	-1	+2	-1	

Figure 6.2. Balance of Measures 1 and 9

This intervallic analysis is based on a diatonic framework, and not a chromatic one, so “+1” represents an ascent by one scale step, whether a whole tone or a semitone. Although Example 6.2 exhibits a kind of balance, this balance plays no role in establishing form in tonal music and therefore is not balanced closure. It is used to provide a contrasting view of the subject, but it does not dictate the form. That responsibility lies with the change in key area that occurs in measure 7 as shown in Example 6.3, where balance plays no role. While this is only one musical piece, a closer look at additional examples of balance within tonal music might lead to finding some instances that are legitimate examples of balanced closure.



Example 6.3. Bach's Invention I, Measure 7

With further investigation, these types of closure could also apply to other styles of post-tonal music. Some of the examples from Chapter 5 are not contingent upon twelve-tone compositional technique, such as the opening passage of Schoenberg's *Concerto for Violin and Orchestra* displayed in Example 5.1, so it stands to follow that these methods of closure could also apply to free atonal music and other post-tonal styles. Other examples of these closure types could be found in music composed prior to the common-practice era, and this may lead to other ways to understand closure.

Through the analysis of Schoenberg's music, this thesis has shown various ways that closure may be understood and heard without the assistance of tonal constructs. The variety of possibilities suggests broader methods of interpretation, as opposed to the more narrowly defined cadential closure of tonal music. By investigating closure in post-tonal music, one might discover additional ideas of closure, ideas that may strengthen the interpretation and appreciation of post-tonal music.

REFERENCES

- Alegant, Brian. "Unveiling Schoenberg's op. 33b." *Music Theory Spectrum* 18, no. 2 (1996): 143–166.
- Babbitt, Milton. "Set Structure as a Compositional Determinant." *Journal of Music Theory* 5 no. 1 (1961): 72–94.
- . "Three Essays on Schoenberg: Concerto for Violin and Orchestra, Das Buch der hangenden Garten, Moses und Aron." In Boretz and Cone, *Perspectives on Schoenberg and Stravinsky* (1972): 47–60.
- . "Twelve-Tone Invariants as Compositional Determinants." *Musical Quarterly* 46 (1960): 246–259.
- Beach, David. "Pitch Structure and the Analytic Process in Atonal Music: An Interpretation of the Theory of Sets." *Music Theory Spectrum* 1 (1979): 7–22.
- Botstein, Leon. "Music and the Critique of culture: Arnold Schoenberg, Heinrich Schenker, and the Emergence of Modernism in fin de Siècle Vienna." In Brand and Hailey, *Constructive Dissonance*, 3–22.
- Brand, Juliane and Christopher Hailey, eds. *Constructive Dissonance: Arnold Schoenberg and the Transformations of Twentieth-Century Culture*. Berkeley: University of California Press, 1997.
- Burkhart, Charles. "The Symmetrical Source of Webern's Opus 5, No. 4." *The Music Forum* 5 (1980): 317–334.
- Cherlin, Michael. *Schoenberg's Musical Imagination*. Cambridge: Cambridge University Press, 2007.
- Dunsby, Jonathan. "Schoenberg on Cadence." *Journal of the Arnold Schoenberg Institute* 4, no. 1 (1980): 41–49.
- Forte, Allen. "Context and Continuity in an Atonal Work." *Perspectives of New Music* 1, no. 2 (1963): 72–88.
- . "Sets and Nonsets in Schoenberg's Atonal Music." *Perspectives of New Music* 11, no. 1 (1972): 43–64.
- . *The Structure of Atonal Music*. New Haven: Yale University Press, 1973.
- Haimo, Ethan. "Schoenberg and the Origins of Atonality." In Brand and Hailey, *Constructive Dissonance*, 71–86.

---. *Schoenberg's Transformation of Musical Language*. Cambridge: Cambridge University Press, 2006.

Haimo, Ethan and Paul Johnson. "Isomorphic Partitioning and Schoenberg's Fourth String Quartet." *Journal of Music Theory* 28, no. 1 (1984): 47–72.

Hanninen, Dora A. "A Theory of Recontextualization in Music: Analyzing Phenomenal Transformations of Repetition." *Music Theory Spectrum* 25, no. 1: 59–97.

Hopkins, Robert G. *Closure and Mahler's Music: The Role of Secondary Parameters*. Philadelphia: University of Pennsylvania Press, 1990.

Hyde, Martha. "Musical Form and the Development of Schoenberg's Twelve Tone Method." *Journal of Music Theory* 29, no. 1 (1985): 85–143.

---. "The Roots of Form in Schoenberg's 'Sketches'." *Journal of Music Theory* 24, no. 1 (1980): 1–36.

Kurth, Richard. "Moments of Closure: Thoughts on the Suspension of Tonality in Schoenberg's Fourth Quartet and Trio." In *Music of My Future: The Schoenberg Quartets and Trio*, edited by Reinhold Brinkmann and Christoph Wolff, 139–160. Cambridge: Harvard University Press, 2000.

---. "Mosaic Polyphony: Formal Balance, Imbalance, and Phrase Formation in the Prelude of Schoenberg's Suite, Op. 25." *Music Theory Spectrum* 14, no. 2 (1992): 188–208.

Lewin, David. "Generalized Interval Systems for Babbitt's Lists, and for Schoenberg's String Trio." *Music Theory Spectrum* 17, no. 1 (1995): 81–118.

---. *Generalized Musical Intervals and Transformations*. New Haven: Yale University Press, 1987.

---. "Inversional Balance as an Organizing Force in Schoenberg's Music and Thought." *Perspectives of New Music* 6, no. 2 (1968): 1–21.

---. *Musical Form and Transformation: 4 Analytic Essays*. New Haven: Yale University Press, 1993.

---. "On Partial Ordering." *Perspectives of New Music* 14/15, Vol. 14 no. 2–Vol. 15 no. 1 (1976): 252–257.

---. "Some Ideas About Voice-Leading Between Pcsets." *Journal of Music Theory* 42 (1998): 15–72.

---. "A Study of Hexachord Levels in Schoenberg's Violin Fantasy." *Perspectives of New Music* 6, no. 1 (1967): 18–32.

- . "Transformational Techniques in Atonal and Other Music Theories." *Perspectives of New Music* 21, no. 1–2 (1982–83): 312–371.
- . "A Theory of Segmental Association for Twelve-Tone Music." *Perspectives of New Music* 1, no. 1 (1962): 89–116.
- Martino, Donald. "The Source Set and Its Aggregate Formations." *Journal of Music Theory* 5, no. 2 (1961): 224–273.
- Mead, Andrew. "Large-Scale Strategy in Arnold Schoenberg's Twelve-Tone Music." *Perspectives of New Music* 24, no. 1 (1986): 120–157.
- . "Some Implications of the Pitch Class/Order Number Isomorphism Inherent in the Twelve-Tone System: Part One." *Perspectives of New Music* 26, no. 2 (1988): 96–163.
- . "'Tonal' Forms in Arnold Schoenberg's Twelve-Tone Music." *Music Theory Spectrum* 9(1987): 67–92.
- Morris, Robert. "Modes of Coherence and Continuity in Schoenberg's Piano Piece, Op. 23, No. 1." *Theory and Practice* 17(1992): 5–34.
- . "Voice-Leading Spaces." *Music Theory Spectrum* 20 (1998): 175–208.
- Perle, George. "'Free' Atonality." In *Serial Composition and Atonality: An Introduction to the Music of Schoenberg, Berg, and Webern*, 3rd ed., 9–39. Berkeley: University of California Press, 1972.
- Rahn, John. *Basic Atonal Theory*. New York: Longman, 1980.
- . "Repetition." *Contemporary Music Review* 7, no. 2 (1993): 49–57.
- Schenker, Heinrich. *Harmony*. Edited by Oswald Jonas. Translated by Elisabeth Mann Borgese. Chicago: University of Chicago Press, 1954.
- Schoenberg, Arnold. *Style and Idea: Selected Writings of Arnold Schoenberg*. Edited by Leonard Stein. Translated by Leo Black. Revised edition. Berkeley and Los Angeles: University of California Press, 1984.
- . *Theory of Harmony*. Translated by Roy E. Carter. Berkeley: University of California Press, 1978 (1911, 1922).
- Smith, Barbara Herrnstein. *Poetic Closure: A Study of How Poems End*. Chicago: University of Chicago Press, 1968.
- Straus, Joseph. "Uniformity, Balance, and Smoothness in Atonal Voice Leading." *Music Theory Spectrum* 25, no. 2 (2003): 305–352.

---. "The Problem of Prolongation in Post-Tonal Music." *Journal of Music Theory* 31, no. 1 (1987): 1–21.

Westergaard, Peter. "Webern and 'Total Organization': An Analysis of the Second Movement of the Piano Variations, Op. 27." *Perspectives of New Music* 1, no. 2 (1963): 107–120.

APPENDIX

First Statement		Balancing Statement		Simultaneous statements		No balance
Measure	Row	Measure	Row	Measure	Row(s)	Measure
1-4	T0(S)	5-8	T5I(S)			
9-11	T0(S)	11-14	T5I(S)			
15-16	T0(S)	17-19	T5I(S)			
20-21	T0(S)	22-23	T5I(S)			
24-26	T0(S)	27-28	T5I(S)			
29-30	T0(S)	30-31	T5I(S)			
32-33	T5I(S)	34-35	T0(S)			
36-38	T5I(S)	39-41	T0(S)			
				42-44	T0(S) & T5I(S)	
				45-46	T5I(S) & T0(S)	
				47-48	T4(S) & T9I(S)	
				49-50	RT1I(S) & RT8(S)	
				51-52	T3(S) & T8I(S)	
52-54	T0(S)	55-57	TR0(S)	58	T5I(S) & RT5I(S)	
				59-60	T7(S)	
61-63	RT7(S) & T0I(S)	64-66	RT0I(S) & T7(S)			
67	RT0I(S)	68	T7(S)			
69-70	T10I(S)	71-72	T5(S)			
73-74	T3(S)	74-75	T8I(S)			
76-77	T3(S)	77-78	T8I(S)			
				79-80	T9(S) & T2I(S)	
				81-83	RT9(S) & RT2I(S)	
83-84	T5(S)	84-85	T10I(S)	85-86	T5(S) & T10I(S)	
86-87	T10I(S)	87-88	RT5(S)			
				89-90	RT5(S) & RT10I(S)	
90	T5(S)	90	RT10I(S)			
	RT5(S) &					
91	T10I(S)	91	T5(S) & RT10I(S)			
92	T5(S) & T10I(S)	92	RT5(S) & RT10I(S)			End of Expo.
		100-				
93-99	T8(S) high	105	T8(S) low			
106-112	T8(S)	&	T1I(S)			
113	T1I(S)	114	T8(S)			
114-115	T1I(S)	115	T8(S)			
				116-	T8(S) & T1I(S)	

				118		
				119-		
				121	T4(S) & T9I(S)	
				122-		
				125	T9I(S) & T4(S)	
126-127	T9I(S) & T4(S)	128-				
	RT9I(S) &	129	RT4(S) & RT9I(S)			
130	RT4(S)	131	RT4(S) & RT9I(S)			
132	T9I(S) & T4(S)	133-				
		134	RT4(S) & RT9I(S)			
135-136	T4(S) & T9I(S)	136-				
		137	RT9I(S) & RT4(S)			
				138-	RT7(S) &	
				142	RT11I(S)	
				143-		
				144	T7(S) & T11I(S)	
145-146	both(1st hex)	147-				
		148	R both(1st hex)		T7(S) & T11I(S)	
149-150	both(2nd hex)	151-				
		152	R both(2nd hex)		T7(S) & T11I(S)	
153-156	T7(S)	157-				
		161	TR11I(S)			
				162-		
				165	T3(S) & T8I(S)	
166-169	T3(S) & T8I(S)	170-				
		174	T8I(S) & T3(S)			
175-176	T10(S)	177-				
		180	RT10(S)			
				181-		
				196	T10(S) & T3I(S)	
197-199	T11I(S)	200-				
		201	T6(S)			
202-203	T11I(S)	203-				
		204	T6(S)			
205-208	T11I(S)	208-				
		211	T6(S)			
212-214	T2I(S)	214-				
		215	T9(S)			
215-216	T9(S) & T2I(S)	217-				
		219	RT9(S) & RT2I(S)			
222	T5(S)	223	T10I(S)			
224	T5(S)	225	T10I(S)			
226-227	T5(S)	228-				
		229	T10I(S)			
230-231	T5(S)	232	T10I(S)			
						220-221

233Cadenza	T3(S) T11(S)		T8I(S) T6(S)				
234-235	T4I(S)	236- 237	T11(S)				
238	T5(S) & T10I(S)	239	T10I(S) & T5(S)				
240	T5(S) & T10I(S)	241	RT10I(S) & RT5(S)				
242	T0(S)	243	T5I(S)				
244-245	T0(S)	245- 246	T5I(S)				
247	T5I(S)	248- 249	T0(S)				
249-205	T0(S)	251- 252	T5I(S)				
252-253	T0(S)	254- 255	T5I(S)				
256	T0(S)	257- 259	T5I(S)				
259-260	TR5I(S)	260- 261	T0(S)				
261-262	TR5I(S)	263- 265	T0(S)				