

PROLONGATION IN POST-TONAL MUSIC: A SURVEY OF ANALYTICAL  
TECHNIQUES AND THEORETICAL CONCEPTS WITH AN ANALYSIS  
OF ALBAN BERG'S OP. 2, NO. 4, *WARM DIE LÜFTE*

David Huff, B.A.

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APPROVED:

Stephen Slottow, Major Professor  
David Schwarz, Minor Professor  
Thomas Sovík, Committee Member  
Eileen Hayes, Chair of the Division of Music  
History, Theory and Ethnomusicology  
Lynn Eustis, Director of Graduate Studies in  
the College of Music  
James C. Scott, Dean of the College of Music  
James D. Meernik, Acting Dean of the Robert  
B. Toulouse School of Graduate Studies

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Prolongation in post-tonal music is a topic that music theorists have engaged for several decades now. The problems of applying Schenkerian analytical techniques to post-tonal music are numerous and have invited several adaptations of the method. The bulk of the thesis offers a survey of prolongational analyses of post-tonal music. Analyses of theorists such as Felix Salzer, Allen Forte, Joseph Straus, Edward Laufer, and Olli Väisälä are examined in order to reveal their various underlying theoretical principles. The thesis concludes with an analysis of Alban Berg's *Warm die Lüfte* from his op. 2 collection that focuses on the prolongation of a referential sonority that forms the background of the song. The analysis highlights the most significant analytical techniques and theoretical concepts explored in the survey and codifies them in a generally applicable method of post-tonal prolongational analysis.

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## CHAPTER 1

### INTRODUCTION

For years music theorists have sought to apply Heinrich Schenker's theory of prolongation to post-tonal music. Such applications have raised as many questions as they have answered, but inquiries into the structure of post-tonal music continue unabated to this very day. The critical problem in finding prolongational structures in non-triadic post-tonal music is the lack of a codified system such as that found in tonal harmony. While voice leading in tonal music is directed by contrapuntal, harmonic, and hierarchical functions, an underlying structural apparatus of similar significance in post-tonal music (if such exists) continues to elude analysts.

This is not to say that theoretical work in this area has failed to increase our understanding of linear organization in twentieth-century music. Indeed, one of the goals of the present work is to highlight the role of previous contributions in bringing us to our current conceptions of post-tonal prolongation. As it stands now, a number of theoretical models have been proposed in an attempt to account for structural tendencies in post-tonal music. Joseph N. Straus cites three models of voice-leading analysis that have varying degrees of applicability to post-tonal music: prolongational, associational, and transformational (Straus 1997a). The goal of this thesis is to evaluate the prolongational voice-leading method, beginning with a survey of the existing literature that discusses analytical techniques, followed by an application of various methods to Alban Berg's



fourth song from his op. 2, *Warm die Lüfte*. The analysis serves to codify the techniques explored in the survey, while the survey itself is, at this time, the most comprehensive overview of the most significant contributions to the theoretical literature on post-tonal prolongation to date.

### The Concept of Prolongation

The concept of prolongation originates from Schenker's idea of "composing out" (*Auskomponierung*), defined as a process by which a musical foreground is generated through elaboration of a fundamental structure. At the most remote background lies the fundamental structure, itself an elaboration of the tonic triad, but the processes that generate the foreground are multiple and derive from various hierarchically related structures beyond the tonic triad. These structures may include sonorities other than the tonic triad and harmonic and contrapuntal processes that connect sonorities. The process of prolongation is a multi-layered form of embellishment that stretches from the most remote background to the musical surface. Thus prolongation may be broadly understood as the composing-out of melodic, harmonic, and contrapuntal processes at various structural levels.

In tonal music the ultimate referential sonority is the tonic triad, and its prolongation is the basis for Schenker's concept of structural levels; it is the fundamental musical material that is expanded and elaborated via the various levels of structure. The idea of hierarchy as a governing principle behind musical organization is a basic tenet of Schenker's theory. Linear analysis, inherently tied to the concept of structural hierarchy,

seeks to identify embellishments and elaborations on the surface of a musical work that serve to prolong more structurally significant objects—such as the tonic triad—to the extent that a stratified representation of the musical work emerges. This stratification offers a more complete picture of the melodic, harmonic, and contrapuntal forces at work and how they interact with other musical elements such as motive, texture, and form.

## CHAPTER 2

### SURVEY OF THE LITERATURE

In this survey I trace the evolution of prolongational analysis of post-tonal repertory from its beginnings with Schenker himself to the most current analytical writings. The survey focuses on early analyses of post-tonal works by theorists such as Felix Salzer and Roy Travis as well as more recent theoretical concepts presented by theorists such as Edward Laufer, Joseph Straus, and Olli Väisälä. Some of these theoretical concepts are then implemented in the analysis of Berg's *Warm die Lüfte*.

#### Schenker

Post-tonal prolongational analysis is based primarily on the theoretical concepts of linear analysis developed by Heinrich Schenker. While this type of analysis was originally fashioned to explain the workings of tonal music, some analysts have attempted to apply it to the post-tonal repertoire. The earliest application of voice-leading analysis to a work comprised of extra-tonal elements is probably Schenker's own analysis of Stravinsky's Concerto for Piano and Wind Instruments (Schenker 1996, 16-17). Schenker's analysis of the concerto is indicative of his attitude toward changing trends in the music of the late nineteenth and early twentieth centuries. In the same article in which the Stravinsky analysis appears Schenker criticizes music theorists of the late nineteenth century for their treatment of increasingly chromatic harmony, making the comment that "some believed a

new theory was needed to explain such composite sounds” (Schenker 1996, 12), and citing Wagner’s “Tristan” chord as an example of such a sonority.

Of his contemporaries Schenker leveled the most criticism at Arnold Schoenberg for his theoretical explanations of the changing trends in harmonic practice. In effect, Schenker used the Stravinsky analysis as a pejorative argument against Schoenberg’s contention that dissonance could be “emancipated” in such a way that all tones of the chromatic scale could enjoy equal status and grant traditionally dissonant sonorities equality with the hierarchically prominent harmonies of common-practice tonality. Schenker concluded that the concerto is an example of poor tonal writing because Stravinsky “contradicts [the tonal] plan where he is able.” (Schenker 1996, 17) This statement highlights Schenker’s view of the concerto as a case of tonality gone wrong rather than as an example of music that incorporates techniques outside of the tonal system—techniques for which there were no systematic explanations during Schenker’s lifetime.

In general, theorists split into two camps regarding the analysis: one that sees it as an important model for analyzing post-tonal music, and another that claims it fails to address important aspects of the composition (Traut 2000, 65). Milton Babbitt wrote that the analysis is successful in “revealing insight into the procedures of Stravinsky’s composition” (Babbitt 1964, 36), and Robert Morgan believes that Schenker inadvertently paved the way to an understanding of prolongation in post-tonal music. (Morgan 1976, 50) Other interpretations hold that the analysis does not adequately

address Stravinsky's compositional processes. William Benjamin contends that traditional linear analysis alone cannot reveal the structure of the concerto (Benjamin 1977), while Straus considers Schenker's analysis to be an "anachronistic" model that fails to "confront the piece on its own terms" (Straus 1982, 263).<sup>1</sup>

The crux of Schenker's analysis rests on what he perceives to be Stravinsky's inability to create cohesion through the use of linear progressions. In particular, Schenker disparages Stravinsky's placement of dissonances at the endings of linear progressions—points of arrival that would otherwise contain only consonant tones (in tonal practice). Ex. 1 is a reproduction of Schenker's reduction of mm. 69-84 of the concerto. Schenker indicates chords where non-harmonic tones appear to obscure the harmony with a star (I have circled the "offending" tones).

Schenker cites the first example in m. 72 where the pitch  $b^1$  is dissonant against the  $F\#$ -major sonority. Schenker's voice-leading graphs of the passage (Ex. 2) reduce out the  $b^1$  from the  $F\#$ -major chord in order to make more tonal "sense" of the passage. As regards notational elements of the sketch, it should be noted that Schenker extensively employs rhythmic realignment and implied tones in these graphs as necessary procedures for fitting the piece into a tonal analysis. Similar observations of these harmonic "contradictions" are made for mm. 74-76. For Schenker these harmonic instabilities blur the line between consonance and dissonance to an unacceptable degree, leading him to

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<sup>1</sup> Straus appears to soften his criticism in his article "Voice Leading in Atonal Music," concluding that Schenker's analysis does in fact adequately reveal tonal implications in the concerto. See Straus 1997a, 264-5.

11

69 70 71 72 73

*fp sub.* ★

74 75 76 77 78 79

★ ★ ★

80 81 82 83 84

Ex. 1. Stravinsky, *Concerto for Piano and Winds*, mm. 69-84.

a)

m. 69 70 71 72 74 75 76 77 78 79 82 83 84

(Octave span)

A: IV<sup>#3</sup> — V I — IV<sup>#3</sup> — V<sup>7</sup> — I

b)

m. 69 70 71 72 75 76 77

Ex. 2. Schenker's analytical sketches of Stravinsky, *Concerto for Piano and Winds*, mm. 69-84.

the conclusion that the excerpt is poorly composed. The subjectivity of Schenker's conclusion should not cloud the real analytical content of his observations, namely, that the concerto contains tonal passages that are obscured by the free use of dissonance. Schenker's analysis can explain how the passage relates to, and deviates from, tonal practice, but it does not—and perhaps cannot—address the specific compositional and organizational procedures involved in Stravinsky's (apparently purposeful) obfuscation of the tonal plan. The question then arises whether post-tonal prolongation can be analyzed without invoking the tonal system as its procedural framework.

#### Katz

Adele T. Katz, a student of Hans Weisse (himself a well-known student of Schenker's) and the first to write an English-language explanation of Schenker's method,<sup>2</sup> was another early practitioner of prolongational analysis of post-tonal music. In her book *Challenge to Musical Tradition*, Katz addresses the application of traditional tonal concepts to post-tonal music:

Analysts who attempt to explain these techniques continue to employ the same descriptive methods that they use for works within the tonal system... It is dangerous, because it re-establishes the past as the pattern on which we evaluate the present and thus unconsciously influences our reactions and responses. It is misleading, because there is no connection between the principles on which the foundations of the old and new systems are laid. The concepts underlying these systems are totally opposed to and have nothing whatsoever in common with tonality (Katz 1945, 294).

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<sup>2</sup> Berry 2002 contains an in-depth discussion of Katz's contributions to Schenkerian analysis in the United States.



Katz makes a distinction between two groups of “challengers” to the musical tradition: one that challenges tradition within the established framework of tonality (the “old system”), and one that challenges tonality itself (the “new system”). Her analysis of Stravinsky’s *L’Oiseau de Feu* and *Le Sacre du Printemps* concludes that they are “extension[s] of the older technique” (Katz 1945, 304), while she contends that *Petrouchka* is an example his use of entirely new techniques, namely bitonality and polyharmony, where “the fundamental concept of tonality no longer prevails” (Katz 1945, 315). Katz then proceeds to explore Schoenberg’s concept of tonality and the ways in which the twelve-tone system constitutes a challenge to the tonal system. In the case of both composers, her prolongational analyses focus on elements of tonality and point out the ways in which the composers have challenged the “old system.”

Katz’s contribution to post-tonal prolongational analysis is primarily conceptual. Her contention that the “new systems” need their own analytical systems is in direct opposition to Schenker’s approach that uses the tonal system as its only basis for interpretation. Although Katz asserts this need for a new system of analysis, her analyses of Stravinsky and Schoenberg are of the same nature as Schenker’s analysis of the Stravinsky Concerto; they generally use tonal practice as the analytical benchmark. Katz’s previous statements regarding the music of Stravinsky and Schoenberg consisting of a “new system” seemingly contradict the fact that her own analyses are so heavily dependent on precepts of tonal practice. The difference between Katz’s and Schenker’s approaches lie in Katz’s recognition that the music and the analytical system are not

wholly reconcilable, which reflects a change of attitude that contrasts Schenker's fervent adherence to the tonal system.

### Salzer

Felix Salzer, a student of Schenker's, was the earliest proponent of post-tonal prolongational analysis. Salzer's *Structural Hearing* (Salzer 1952), one of the first books in English on Schenker's theories, contains many of the earliest prolongational analyses of post-tonal works. Although Salzer believed that Schenker's approach "is not confined to any limited period of music history" (Salzer 1952, xvi), his analyses of Hindemith, Bartók, and Stravinsky often maintain a tonal centricity and, like those of Katz, make their points by highlighting the differences between tonal and post-tonal techniques. Indeed, Salzer describes the musical techniques found in these post-tonal analyses as "contemporary expressions[s] of tonality" (Salzer 1952, 219).

An instructive example of Salzer's post-tonal analyses concerns the first movement of Stravinsky's *Symphony in Three Movements* found in *Structural Hearing*.<sup>3</sup> Ex. 3 is a reproduction of the first eight measures of the movement and Ex. 4 shows Salzer's voice-leading analysis of the first eight measures of the Symphony (Salzer 1952, Ex. 417). Salzer's analysis contains an early example of a non-tonal referential sonority. Analogous to the tonic triad, this harmony built on G is presented as the sonority that generates the prolongational spans in the passage.

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<sup>3</sup> This analysis is found in Salzer 1952. Page 194 of the first volume has a short comment on the sketch; the sketch itself (Ex. 417) is found on page 188 of the second volume.

Salzer's only description of the referential sonority is as a "polychord on G with the D $\flat$  chord as a secondary chord of fusion" (Salzer 1952, 194), leaving most of the analysis to the voice-leading sketch. Salzer's sketch shows a G in the bass prolonged in mm. 3-6 by a stepwise ascent from G to C in mm. 3-4, followed by a chordal skip from C to E in m. 5, and completed by a stepwise ascent from E to G in mm. 5-6. The G is then further prolonged in mm. 6-8 by the neighboring motion, G-F-G. This stepwise bass prolongation is reasonably substantiated by the musical foreground, but Salzer's prolongational readings of the melody line are somewhat more problematic.

The melodic line in mm. 2-3,  $ab^2-g^2-f^3-db^3-ab^3$ , can easily be considered an arpeggiation of the referential sonority. Besides the descent from  $ab^2$  to  $g^2$ , the rest of the figure contains skips between chord tones from the referential sonority. Stepwise motion as part of an arpeggiation is certainly not unheard of in tonal practice—arpeggiation of a seventh chord often contains stepwise motion between the root and 7th of the chord. Matters begin to complicate at the final prolongation of  $A\flat$  found on beat four of mm. 6-7. Is the motion  $A\flat-G-F-E-A\flat$  a prolongation by stepwise motion or by arpeggiation? The distinction is not easily made because although the line is mostly stepwise it is also made up mostly of chord tones from the referential sonority. Besides the E on beat three of measure 7, the rest of the figure contains tones found in the referential sonority. Salzer's reading labels the G and F as passing tones prolonging the  $A\flat$ , but earlier in the passage a similar melodic line is given an entirely different treatment. In mm. 3-4 the line  $A\flat-G-F$  is treated as a chordal skip, or more accurately, a sequence of chord tones from

♩ = 160

Piccolo

Flute

Oboe

Clarinet in B $\flat$

Bass Clarinet

Bassoon

Contrabassoon

Horn in F

Trumpet in C

Trombone

Trombone 3 & Tuba

Timpani

Piano

Violin I

Violin II

Viola

Violoncello

Contrabass

*gliss.*

*fff*

*ff*

*sf*

*sf sempre*

*f marc.*

*f marc.*

*sf*

*non div.*

*sim.*

*non div.*

*sim.*

*non div.*

*sim.*

*non div.*

*sim.*

*non div.*

*sim.*

Ex. 3. Stravinsky, *Symphony in Three Movements*, I, mm. 1-8.

The image displays a musical score for the first movement of Stravinsky's *Symphony in Three Movements*, measures 1 through 8. The score is presented in two staves: the upper staff in treble clef and the lower staff in bass clef. The music is in 3/4 time and features a complex, dissonant harmonic language. Salzer's analysis is indicated by various annotations: vertical lines connect notes between staves; dashed lines and arrows trace specific melodic and harmonic paths; a large bracket under the first four measures is labeled 'N', indicating a Neume; another bracket under measures 5-8 is also labeled 'N'; and a long arrow points from the end of measure 5 to the end of measure 8. Below the main score, a separate musical fragment shows a treble clef with a key signature of one flat (B-flat) and a single note on the second line of the staff.

Ex. 4. Salzer's analysis of Stravinsky, *Symphony in Three Movements*, I, mm. 1-8.

the referential sonority. The F's in measures 3 and 6 in particular are shown to appear in different prolongational operations and yet they are both supported by the same secondary harmony (i.e. a chord that is not the referential sonority).

Such inconsistencies arise in part because Salzer fails to adequately describe how his analytical sketch relates to the referential sonority. A problem in post-tonal prolongation observed by Joseph Straus, such a failure is in large part due to the intervallic make-up of the referential sonority itself (Straus 1987, 8). With so many intervals smaller than a third found in the harmony it is difficult to distinguish between arpeggiation (i.e. melodic movement among chord tones) and linear voice leading (i.e. melodic movement between chord tones). As an example of an early use of non-tonal referential sonority, the sketch presents an important conceptual step in the evolution of post-tonal prolongational analysis, but more importantly it hints at the fact that merely identifying a referential sonority is not enough for a convincing analysis. Once a non-tonal referential sonority is presented as the prolongational generator within a musical work, it follows that, as with the tonic triad, it must create certain musical frameworks that govern the harmony and counterpoint of that work. The necessary distinction between harmonic and non-harmonic intervals and the treatment of consonance and dissonance in the context of non-tonal referential sonorities will be discussed further in the sections on Straus and Väisälä.

Forte

Allen Forte's contributions to the theory and analysis of post-tonal music are well known, but some of his earliest work is in Schenkerian theory.<sup>4</sup> Before developing pitch-class set theory, Forte explored the use of Schenkerian principles of linear analysis as tools for analyzing music of the twentieth century. In *Contemporary Tone Structures* (Forte 1955) Forte presents a method of analyzing post-tonal music. The method he proposes is a generalized form of Schenker's ideas of tonal structure, although he never explicitly cites them as such. Forte's explanations of hierarchical structure as well as his definition of a musical structure as "a complex of ordered and interrelated tonal events which unfolds in time" (Forte 1955, 7) indicate his objective to broaden Schenkerian principles to include non-tonal music. Forte's analytical sketches are of a quasi-Schenkerian nature, many containing familiar patterns of notes connected by beams and slurs to indicate musical structures and procedures, but each analysis is based on the individual materials of the piece. By presenting the tonic-dominant relationship as merely one functional construct based on a particular interval (the perfect fifth), Forte leaves himself enough room to interpret different musical patterns as structural backgrounds. Hence, Forte essentially adopts the concept of referential sonorities other than the tonic triad, although the musical materials he considers structural are not always vertical sonorities.

Forte frames his analytical procedure by outlining a general plan of "attack" by which post-tonal compositions may be approached (Forte 1955, 16). To aid in an initial evaluation of a piece of music, Forte suggests a number of features such as repetition,

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<sup>4</sup> See Forte 1959 for one of the earliest scholarly articles in English explaining the Schenkerian method.

duration, accent, and doubling, which the analyst may use to find structural pitches (Forte 1955, 17). His plan also includes generalized formulations of basic structural events that he feels are applicable to any piece of Western music regardless of whether they are based on a tonic-dominant function or other organizational principles. These formations mostly concern ways in which a musical structure is treated through time, such as interruption, delay, and anticipation (Forte 1955, 18-20).

Ex. 5 is the score of Bartók's *Fourteen Bagatelles*, op. 6, no. 8, and Ex. 6 is Forte's sketch (Forte 1955, 169) that accompanies his analysis of the bagatelle (Forte 1955, 74-90). Forte describes the pitches G, B, and E $\flat$  (listed in order of structural weight) as part of a basic grouping that forms the structural background of the piece (Forte 1955, 78), and the primary means of structural elaboration as "unfolding" (Forte 1955, 75). In Schenkerian analysis an unfolding is the linear statement of an interval that is a simultaneity at a more remote structural level, and Forte's usage roughly corresponds to this definition. These unfoldings take place over the span of the piece and as expansions of the basic grouping over smaller spans. The E $\flat$  (D $\sharp$ ) in measure 5, the climactic B in measure 23, and the final G of measure 32 make up the overall structural instances of the basic grouping. Other nested instances of the grouping occur in mm. 5-10 and mm. 16-23. Based on the intervallic relationships between the tones of the basic



8.

Andante sostenuto  $\frac{2}{4}$   $\text{♩} = 64-60$

*p*

*cresc.*

*p*

Sostenuto  $\frac{2}{4}$   $\text{♩} = 42-46$

*espr.*

*p*

*pp*

*pp*

*p*

*pp*

*poco agitato*

*f*

$\frac{2}{4}$

Più sostenuto  $\frac{2}{4}$   $\text{♩} = 38$

*poco rit.*

*mp*

*dim.*

Ritenuito

*p dobriss.*

Ex. 5. Bartók, *Fourteen Bagatelles*, Op. 6, No. 8.

m. 1            4    5                    10    12            14    16            18    19    21                    23    24                    26                    28            31                    32

The image shows a musical score for Bartók's *Fourteen Bagatelles*, Op. 6, No. 8. The score is presented in a grand staff format, with a treble clef staff on top and a bass clef staff on the bottom. The music is written in a key signature of one sharp (F#) and a 3/4 time signature. The score is divided into measures, with measure numbers 1, 4, 5, 10, 12, 14, 16, 18, 19, 21, 23, 24, 26, 28, 31, and 32 marked above the staff. The musical notation includes various note values, rests, and accidentals. Overlaid on the score is Forte's analytical sketch, which consists of a treble clef staff with melodic lines and a bass clef staff with chordal structures. A large black triangle connects the bass clef staff from measure 1 to measure 19, and another large black rectangle connects the bass clef staff from measure 26 to measure 32. Dashed lines and arrows indicate relationships between notes in the treble and bass staves.

Ex. 6. Forte's analytical sketch of Bartók, *Fourteen Bagatelles*, Op. 6, No. 8.

grouping G-B-E $\flat$ , Forte considers the major third<sup>5</sup> to be one of two intervals that hold a functional status in the piece. The other structural interval is the semitone, and Forte presents the concept of qualifying tones to explain one aspect of the interval's function in the piece (Forte 1955, 81-82). According to Forte's definition, a qualifying tone lies a semitone away from a structural pitch and serves to highlight it through delay. Forte does not explicitly differentiate between the qualifying tone and traditional neighbor or incomplete neighbor embellishments, but his insistence on the semitone as a characteristic interval seems to sufficiently distinguish the qualifying tone as a unique embellishment in the context of this musical work. In mm. 6-10 the A $\sharp$  in the inner voice essentially acts as a foil for the structural pitch B, subtly emphasizing it through the contrast of the semitone. The A $\flat$  in both upper and lower voices in mm. 16-17 achieves the same effect for the structural G. Similarly, the F $\sharp$  in mm. 28-32 functions as a qualifying tone for the structural G and in fact the tone F $\sharp$  functions in this regard over the span of the piece. Forte observes that in the F $\sharp$ -G semitone relationship acts as a large-scale qualifier for the structural G, and he considers register to be a determining factor in the completion of the overall F $\sharp$ -G semitone motion (Forte 1955, 87). The repeated upper-voice F $\sharp$  in mm. 6-8 does not connect directly to a G in the same register but is instead delayed until further into the piece (m. 15). Then the F $\sharp$  reappears in m. 28, finally resolving to the G in the same register on the last eighth note of m. 32. Thus,

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<sup>5</sup> Forte uses the term "large third" in place of the conventional "major third" so as to "avoid the implication of triadic tonality" (Forte 1955, 76n).

in Forte's view, the semitone essentially functions as a prolonging interval over short and long spans of the music. The role of register as a functional determinant is also an important concept in post-tonal prolongation that will be explored further in later sections.

Overall Forte's analysis is an insightful portrait of the musical structure of Bartók's bagatelle. The prolongation of the basic grouping G-B-E $\flat$  through unfolding on small and large spans is a readily apparent explanation of the structure, and Forte's concept of qualifying tones as embellishments that point to structural pitches is an idea that will be discussed further. Forte retains clarity in his analyses by addressing Schenkerian concepts in only the most general sense and formulates specific analytical methods based on the particulars of each piece. A common thread throughout Forte's analyses of works by Stravinsky, Hindemith, Bartók, Schoenberg, and others, is the guiding notion that each composition has its own means of structural cohesion. This essential observation, that certain organizational aspects of a composition may be unique to that work, will be explored further in sections on later analysts. Although Forte eventually shifted from such quasi-Schenkerian applications in favor of pitch-class set theory, his post-tonal analyses have continued to deal with linear aspects of musical structure.<sup>6</sup>

Travis

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<sup>6</sup> See Straus 1997a for a discussion on the "associational" voice-leading analysis attributed to Forte.

No doubt influenced by Felix Salzer's previous work on post-tonal prolongation,<sup>7</sup> Roy Travis was the first scholar to publish analyses dealing explicitly with the theoretical implications of non-tonal referential sonorities. In his 1959 article "Towards a New Concept of Tonality?" Travis makes the case for a prolonged non-tonal chord in Stravinsky's *Rite of Spring* (Travis 1959). Some key points give theoretical support to the idea of non-tonal referential sonorities and differentiate Travis's analysis from previous efforts.

Travis offers a definition of tonality that offers a theoretical basis for non-tonal "tonic sonorities." Reminiscent of Forte's broad definition of a "musical structure," Travis's definition states "music is tonal when its motion unfolds through time a particular tone, interval, or chord" (Travis 1959, 261). In generalizing the Schenkerian concept of the tonic, Travis, like Forte, offers the possibility that any combination of tones may act as the structural basis of a composition. While very similar to Forte's quasi-Schenkerian treatment of non-tonal structures, this definition is focused explicitly toward the idea of a non-tonal "tonic," or referential sonority. Travis goes on to compare the origins of the major and minor tonic triads, making the point that musical structures based on the major tonic can be traced back to the single tonic pitch as a generator through the overtone series while the minor tonic is not entirely based in nature (Travis

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<sup>7</sup> Travis and Salzer's teaching appointments at the Mannes College coincided for a time (1952-6) and Travis makes numerous references to *Structural Hearing* in his two articles on post-tonal prolongation (Travis 1959; 1966).

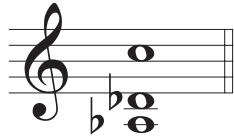
1959, 263).<sup>8</sup> Citing the minor tonic as an example of a tonic sonority not derived entirely from the overtone series, Travis asserts that “there is no reason why a major or minor triad, a 7<sup>th</sup> chord, a 4<sup>th</sup> chord, a polychord, or any other conceivable combination of tones appropriate to the composer’s artistic purpose cannot become the tonic sonority of a tonal music” (Travis 1959, 263). In broadening the analytical field to include any possible sonority, Travis avoids the discussion of the “old” and “new” systems and instead focuses on the structure of the sonority. For Travis the particular intervallic structure of a “tonic” chord is inconsequential as long as the motion within the musical work reflects that structure.

In his analysis of an excerpt from Stravinsky’s *Rite of Spring*, Travis identifies the “tonic sonority” he finds as being in a “precise spacing,” meaning its identity is dependent on a particular registral placement of its constituent tones (Travis 1959, 260). Ex. 7a shows Travis’s “tonic sonority” and Ex. 7b shows the places where it occurs in the Stravinsky excerpt (indicated with boxes). Travis bases his prolongational analysis of this passage primarily on the octave spans that occur in the uppermost and lowermost voices during mm. 4-9. Ex. 8a and 8b are two of Travis’s analytical sketches tracing the octave spans at two levels of structure. The beamed notes in Ex. 8b form a contrapuntal structure (abbreviated C.S. in Ex. 8) akin to a prolongational span in tonal analysis. In this case the structure of the referential sonority is defined by successive

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<sup>8</sup> Schenker’s belief in the minor mode as a product of art is reflected in titles of the chapters from *Harmony on the major and minor modes*, “The Natural Tonal System” and “The Artificial Tonal System” (Schenker 1954, xxix).

a)



b)

A musical score for the first nine measures of Stravinsky's *Rite of Spring*. The score is written for a woodwind ensemble and piano. It features complex rhythmic patterns, including triplets and quintuplets, and frequent changes in meter (4/4, 3/4, 2/4, 3/2, 2/2). The instruments are labeled: Bn. (Bassoon), Hn. (Horn), Cl. (Clarinet), Picc. (Piccolo), and Bcl. (Bassoon). The score includes various musical notations such as slurs, accents, and dynamic markings.

Ex. 7. (a) Travis's "tonic sonority" from (b) Stravinsky, *Rite of Spring*, mm. 1-9.

a)

Diagram a) shows a musical score for the first nine measures of Stravinsky's *Rite of Spring*. The score is written in treble and bass clefs. The bass line is annotated with a bracket labeled 'I' under the first measure, and three arrows labeled 'C.S.<sup>1</sup>', 'C.S.<sup>2</sup>', and 'C.S.<sup>3</sup>' pointing to the second, third, and fourth measures respectively. A fourth bracket labeled 'I' is under the last three measures. The treble line has a circled '5' above the fifth measure and 'N' above the eighth and ninth measures. Vertical bar lines are present at the end of each measure.

b)

Diagram b) shows an analytical sketch of the bass line from the first nine measures of Stravinsky's *Rite of Spring*. The sketch is written in bass clef and shows the harmonic structure. A bracket labeled 'I' is under the first measure, and three arrows labeled 'C.S.<sup>1</sup>', 'C.S.<sup>2</sup>', and 'C.S.<sup>3</sup>' point to the second, third, and fourth measures respectively. A final bracket labeled 'I' is under the last measure. A smaller sketch below shows a single chord in bass clef.

Ex. 8. Travis's analytical sketches of Stravinsky, *Rite of Spring*, mm. 1-9.



transpositions descending in thirds until the whole step descent from B $\flat$  to A $\flat$  concludes the octave span. The exact transpositions are found in the foreground clearly enough, but Travis's criteria for how the structural weight of some transpositions is differentiated from that of others is not as clear. The rhythmic displacement of the A $\sharp$  from the structural chord in m. 5 and the octave displacement of the C $\sharp$  in the melody line in m. 7 are both common procedures that would be perfectly acceptable in a texturally similar reading of a tonal passage and do not in themselves disqualify the concerned chords from being structural (see Ex. 8a). The structural chords on F $\sharp$  and D $\sharp$  in mm. 5-6 are metrically accented, which lends credence to their structural status, but the last two transposition does not share this feature. It is not entirely clear why Travis considers the chord on B $\flat$  to be structural besides the fact that it contribute to the descending thirds motion that forms the prolongational span of the passage. For Travis the descending thirds pattern rules the reading and he maintains that, as a contrapuntal structure, it defines the referential sonority much in the same way a similar descending thirds motion might prolong a chord in a tonal work. It should be noted that there is somewhat of a circular nature to Travis's analysis in that he chooses to consider transpositions of the referential sonority as structural as long as they fit into his predetermined concept of the descending thirds pattern. Without the contextual factor of metrical accent to aid the case of the chord on B $\flat$ , the reader is left to make a leap of faith (in this case the distance of a major third) in order to validate the completion of the descending thirds pattern. Travis makes only one remark in support of his reading of the structural points of the octave

span: “It is almost a general principle of musical coherence that those chords which mark the beginning or end of a given procedure of motion tend to serve in a structurally more important capacity than the chords in the midst of that motion” (Travis 1959, 266). The idea that the frequency of a chord’s appearance may reflect its structural status can be a useful analytical tool in the study of post-tonal prolongation, and this notion will be explored further in the section on Väisälä.

Travis’s article is an early example of an explicit effort to reconcile Schenkerian principles with post-tonal music by means of theoretical formulation and analytical comparison. Before this article discussions focused on differences between the “old” and the “new” or, in the case of Salzer’s analysis, did not provide much theoretical support and chose to let the analysis stand on its own. While not all of the analytical decisions are as clear as they might be for a tonal analysis, the importance of this analysis lies in its author’s theoretical objective to find a more general application of the principles of structure as derived from a harmonic entity.

#### Lester

Some theorists have given more attention to contrapuntal aspects of post-tonal prolongation, electing to consider atonal structure as the product of contrapuntal motion rather than a governing background harmony. Joel Lester’s dissertation “A Theory of Atonal Prolongations as Used in an Analysis of the *Serenade* op. 24 by Arnold Schoenberg” examines the problem of consonance and dissonance and its relation to prolongation in atonal music. Lester makes the crucial observation that once any

combination of pitches may construct a chord no rationale exists to explain the difference between a step and a skip (Lester 1970, 2). In tonality steps divide skips, but in Lester's system a skip may be divided by any interval. Lester's operational designation for a tone that divides an interval symmetrically is a division tone (Lester 1970, 4). The proximity principle in tonal music is regarded as the difference between steps and skips. Lester's system retains this formulation with the condition that half steps are stronger embellishments and whole steps weaker (Lester 1970, 4). Thus Lester creates a system based on the proximity principle to account for certain atonal voice-leading tendencies in the pursuit of a system of atonal consonance and dissonance.

What Lester does not do is examine how these formulations may be related to a referential sonority. For Lester, contrapuntal operations such as the division tone, passing tones, and neighbor tones are the generators of the atonal system. In other words, any structural elements found in an atonal composition are a result of the confluence of linear motion and not of some preconceived harmonic entity. This is different from the idea of a musical work as generated by the basic materials of the tonic triad (or a referential sonority). Lester admits that his method is designed for a particular set of works, namely the atonal compositions of Arnold Schoenberg, and that it does not represent a "tight theoretical system" (Lester 1970, 5). While Lester's system is not a generalized theory of post-tonal prolongation, it does raise crucial points with regard to the differences between steps and leaps and their relations to consonance and dissonance.

Straus

The discussion of consonance and dissonance in post-tonal prolongation stagnated for some time after Lester's dissertation, but, ironically, a theoretical discussion aimed at discounting the notion of post-tonal prolongation has shed much light on the subject. Joseph Straus's "The Problem of Prolongation in Post-Tonal Music" is an extensive review of the essential features of prolongation as well as a critique of attempts to find prolongation in post-tonal works. In the article Straus defines four conditions under which prolongation may be verified or disqualified as a structural operation. Straus's conditions are defined as follows (Straus 1987, 2-7):

(1) *The Consonance-Dissonance Condition.* There must be a consistent distinction between consonant and dissonant sonorities. That is to say that there must be a clear distinction between pitches or collections of pitches that are stable compared to those that are not stable and operate as embellishments. Without this condition there can be no certainty as to which sonorities are structural and therefore what, if anything, has been prolonged.

(2) *The Scale-Degree Condition.* A consistent hierarchy of consonant sonorities must be established in order to allow for prolongation across longer spans. In tonal music the remotest levels of structure are mostly defined by interaction between consonant harmonies such as the tonic and dominant triads, but these consonant harmonies themselves are ranked according to their structural weight. Without the hierarchical relationships among harmonies comparable to those found in the tonal system it is difficult to determine how remote structures operate.

(3) *The Embellishment Condition*. Prolongation types must correspond to some sort of consistent contrapuntal operation. In tonal music the basic melodic prolongation types are the passing tone, neighboring tone, and arpeggiation. This condition is heavily dependent on the first condition because melodic embellishments must have a consistent and well-defined relationship with the tones that they embellish.

(4) *The Harmony/Voice Leading Condition*. A distinction must be drawn between vertical and horizontal structures. In tonal music vertical harmonic sonorities are triadic—they are constructed with intervals larger than a step—while horizontal melodic motion typically moves by step. In general, when melodic motion exceeds a step it serves to arpeggiate a harmony. As with the third condition, this is dependent on the first condition because if no normative structural harmony exists it is impossible to know which intervals can be considered products of voice leading and which are part of the prevailing harmonic structure.

While Straus's prescriptions appear to be thorough enough to provide guidelines for prolongation, they have not escaped criticism. Some analysts have pointed out that Straus's rules, especially the first, tend to be too rigid and that exceptions within the tonal literature exist to prove them wrong (Larson 1997), but as Straus states in his responses, the exceptions are just that and any impact such discrepancies may have on the validity of his rules is of "little practical consequence" (Straus 1997b, 138). Other criticisms have arisen over the validity of the reasoning behind the conditions because they are constructed around the premise of conventional tonality and to say that they do not apply

to non-tonal music is circular reasoning (Lerdahl 1989, 67). In a response to Straus, Travis makes the point that “whether one hears a particular example as a prolongation or merely as a succession of discontinuous events depends upon a pragmatic evaluation of the context, and not upon the rigid application of Mr. Straus's rules” (Travis 1990, 380). Notwithstanding Travis’s objections, Straus’s conditions, while strict, are in fact broadly defined enough to allow for alternative interpretations without violating their core requirements. Despite the somewhat inflexible quality of Straus’s rules, they stand as benchmarks that will be used to appraise post-tonal prolongational analyses in the remainder of this thesis.

In his appraisal of post-tonal prolongation, Straus examines two significant analytical examples including the previously mentioned analysis of Stravinsky’s *Symphony in Three Movements* by Felix Salzer, and another analysis by Roy Travis, this time focusing on a Second Viennese composition (Ex. 9). The following discussion contains some general observations of how the Travis analysis compares to the four conditions. Ex. 10 reproduces Roy Travis’s analytical sketch of Schoenberg’s *Kleine Klavierstück, op. 19 no. 2* (Travis 1966, 85-87). Travis begins his analysis by identifying a “tonic sonority” that appears only in the final measure of the piece. The graph shows a bass motion from G to C underneath a B to E $\flat$  motion in the top voice. Both of these connections have intermediate spans that occur between mm. 2-8. In the bass a G $\flat$ /F $\sharp$  is shown to be a chromatic passing tone that is prolonged in mm. 2-6 and is part of a descent to C in mm. 7-9. First we must ask: how does Travis conclude that this G $\flat$ /F $\sharp$  is

1 **Langsam** (♩)

2

3 **p espress.**

4

*molto staccato pp*

*mf*

*pp*

5

6

7 **gut im Takt**

8

9 **poco rit.**

*pp*

*pp*

Ex. 9. Schoenberg, *Kleine Klavierstücke*, Op. 19/2.

N. B. (outward-stemming is meant to suggest structural rather than rhythmic values)

(overall top-voice)

ascent anticipated in diminution)

1 2 3 4 5

6 7 8 9

passing

**V**

**I**

Annotations include:  $B\flat$ ,  $(d\sharp)$ ,  $(e\flat)$ ,  $(e)$ ,  $B\sharp$ ,  $E\flat$ ,  $(d\sharp)$ ,  $C$ ,  $B\sharp - E\flat$ ,  $G$ ,  $C$ ,  $G$ ,  $C$ ,  $G\flat$ ,  $E\flat$ ,  $(f\sharp)$ ,  $poco rit.$ ,  $g\flat$ ,  $f\sharp$ ,  $e\flat$ ,  $d\flat$  (phryg.),  $C$ .

Ex. 10. Roy Travis's analysis of Schoenberg, Op. 19/2.



more structurally significant than any other pitches around it? One problem in answering this question is that the three instances of the G $\flat$ /F $\sharp$  all appear as part of different sonorities. Travis offers no way to determine where these sonorities fit in a harmonic hierarchy, and therefore where the G $\flat$ /F $\sharp$  fits within a continuum of consonance and dissonance. Without these determining factors there is no way to support the analytical assertion that the G $\flat$ /F $\sharp$  is (1) structurally superior to other pitches and (2) is a large-scale embellishment of the overall bass pattern G-C. These factors are related to Straus's first and second conditions, both involving the hierarchical positioning of pitches and sonorities.

Another issue with Travis's analysis, one concerned with Straus's third and fourth conditions, is that the F $\sharp$  in m. 2 occurs within harmonies that contain the structural bass note G, including the referential sonority. In essence, Travis simultaneously claims that the G $\flat$ /F $\sharp$  is related to the bass note G by a harmonic interval and a voice-leading interval. Straus's fourth condition states that a distinction must be made between intervals of structural sonorities and voice-leading intervals that act as embellishments to them. Because the G $\flat$  is part of Travis's "tonic sonority" it is hard to make the case that it also functions as an embellishment to the overall bass pattern without some way of determining what conditions create these functional differences. As Straus asserts, this is partially due to the intervallic makeup of the referential sonority (Straus 1987, 8-10). Because the final chord contains eight pitches, and therefore multiple intervals including whole- and semi-tones, it is difficult to draw a distinction between the intervals of the

sonority and any voice-leading intervals that might serve to prolong it. The lack of consistency in harmony and voice-leading processes as explained in the analysis is directly linked to the identity of Travis's proposed referential sonority. Thus the question arises: how may a post-tonal referential sonority be determined that can adhere to Straus's conditions of prolongation?

A crucial problem raised by Straus's conditions (especially the first and second) with regard to the post-tonal repertory is the absence of an all-inclusive, governing sonority common to works of this type. Many efforts to identify voice-leading procedures in post-tonal music have used the idea of tonal remnants as a starting point. This methodology is characterized by the attempt to uncover tonal harmonies that lie subsumed beneath an atonal foreground as well as an adherence to Schenker's conception of the *Ursatz* as a universal structure. This type of analysis has proved fruitful in the investigation of certain compositions, but as Edward R. Pearsall states, "the identification of a hierarchical arrangement of pitches that is unique to each atonal composition may lead to more successful results" (Pearsall 1991, 347). In the study of post-tonal prolongation this "arrangement of pitches" may be referred to as a referential sonority, and is defined as a primary harmony that governs the large-scale structure of a musical work.

Laufer

The basis of the concept of referential sonorities is embodied in Roy Travis's contention that "music is tonal when its motion unfolds through time a particular tone,

interval, or chord” (Travis 1959, 261). Tonality thus redefined takes on a new meaning, one that allows for a “tonic” sonority other than the major or minor triad. Conceptually this generalized definition of tonality helps widen the scope of prolongational inquiry, but in practical terms it raises more questions for the analyst than it answers. Two considerations in particular must be addressed as part of the discussion of prolongation of referential sonorities. The first involves the question of whether a generalized methodology can be prescribed for defining a referential sonority. The second pertains to how the concept of referential sonority relates to Straus’s four principles of prolongation.

Edward Laufer posits that in lieu of the tonic triad, a primary sonority particular to an individual piece can be established by normative emphatic gestures (phrasal placement, dynamics, instrumentation, etc.) (Laufer 2004, 133-134). In his 2004 article “An Approach to Linear Analysis of Some Early Twentieth-Century Compositions,” Laufer presents three guidelines for determining the prime sonority of a piece. Below are brief descriptions of each of Laufer’s guidelines:

(1) The primary sonority will consist of three or more tones that are emphasized by phrasal “placement, accent, dynamics, duration, instrumentation,” and association with textual elements. In other words, some type of emphatic gesture will highlight the presence of tones from the primary sonority.

(2) The primary sonority will be presented in some normative fashion. That is to say that the sonority will often be found at key structural points, especially at the end of a piece, and that it will be presented with consistent registral positioning. Consequently,

changes in registral position will usually mark a change in context, such as a phrasal goal or a cadence point.

(3) The primary sonority will be associated with some prominent motivic feature. Often this motivic feature will involve a linear projection of the primary sonority. This process of linear projection is analogous to the Schenkerian principle of composing-out, where a chord or interval is prolonged through the linearization of its constituent tones. Laufer uses these criteria in his analysis of Bartok's "Diminished Fifth" from *Mikrokosmos* (Ex. 11). The analysis (Ex. 12) shows that Laufer interprets the initial statement of the primary sonority in m. 1 as the beginning of an initial ascent, a familiar Schenkerian principle. The notes within the box in Ex. 12b are those of the primary sonority. The first instance of the primary sonority is projected by a small-scale linear progression, the initial ascent in mm. 1-2. Laufer views the primary sonority's large-scale linear progression as beginning in mm. 6-7 with a formation of two perfect fourth intervals separated by a diminished fifth (Ex. 12a), with A $\flat$  and E $\flat$  in the treble and D and A in the bass. Laufer reads the sonority as being composed out in mm. 6-21 by way of the linear progressions A $\flat$ -G $\flat$ -E $\flat$ -D in the melody. The first full descent of the linear progression is completed at m. 21 where the pitches from mm. 6-7 are exchanged between the melody and bass (Ex. 12b). The exchange is an example of Laufer's second guideline, that is a registral shift occurring at a cadence point. The second linear progression spans mm. 30-44 with a similar exchange of pitches between the melody and bass. In both cases the referential

Con moto, ♩ = 110

5

*p*

8

*mp*

15

*p*

22

*mf*

29

36

*ritard*

The image shows a piano score for a piece by Béla Bartók. The score is written in 2/4 time and consists of six systems of two staves each (treble and bass clef). The tempo is marked 'Con moto' with a quarter note equal to 110 beats per minute. The key signature has two flats (B-flat and E-flat). The piece begins with a piano (*p*) dynamic. The first system ends with a measure number of 5. The second system starts at measure 8 and includes a mezzo-piano (*mp*) dynamic marking. The third system starts at measure 15 and includes a piano (*p*) dynamic marking. The fourth system starts at measure 22 and includes a mezzo-forte (*mf*) dynamic marking. The fifth system starts at measure 29. The sixth system starts at measure 36 and includes a ritardando (*ritard*) marking. The piece concludes with a fermata over the final chord.

Ex. 11. Bartók, "Diminished Fifth."

a)

m. 6 12 16 20 26 29-30 30-31 33 35-44

b)

(="Diminished Fifth")

(Nn)

Detailed description: The image shows two parts of a musical analysis. Part (a) is a piano score for measures 6, 12, 16, 20, 26, 29-30, 30-31, 33, and 35-44. It features a treble and bass clef with various notes and rests. Annotations include circles around specific groups of notes in both staves and horizontal brackets above the treble staff. Part (b) is a more detailed analysis of the piano accompaniment, showing vertical brackets around chords in both staves. Labels include '(="Diminished Fifth")' pointing to a specific interval and '(Nn)' pointing to a note in the treble staff.

Ex. 12. Laufer's analytical sketches of Bartók, "Diminished Fifth."

sonority appears melodically, both in the linear progressions as well as at the local level where the primary sonority's constituent pitches never sound vertically all at once due to the two-voice texture.

#### Väisälä

The rigor of Straus's conditions for prolongation (pp. 17-18) affords the opportunity to compare referential sonorities found under Laufer's guidelines to Straus's four conditions to determine how well any prolongational analysis of a post-tonal work can be supported. Looking to the work of Olli Väisälä in the area of post-tonal prolongation will aid this comparison. Väisälä's dissertation "Prolongation in Early Post-tonal Music: Analytical Examples and Theoretical Principles" presents a theory of post-tonal prolongation and is among the most systematic studies of this topic to date. Väisälä makes the crucial point that while Straus's conditions are based on observations of tonal practice they do not rely on its particulars. Therefore Straus's conditions may be sufficiently generalized to address non-tonal referential sonorities. Väisälä takes advantage of this by constructing his methodology around aspects relevant to both tonal and post-tonal literature that can be supported by certain norms of aural perception. The methodology is founded upon four generalized principles designed to address Straus's conditions in the context of post-tonal prolongation of a referential sonority. These four corresponding principles provide the analytical framework for Väisälä's theory of post-tonal prolongation.

In the section on Straus it was stated that Straus's four conditions of prolongation call for consistent hierarchical relationships between tones on the small scale (condition 1) and harmonies on the large scale (condition 2). Väisälä treats Straus's conditions as encompassing two general categories: harmonic stability (1 & 2) and melodic relationships (3 & 4). Conditions 1 and 2 both address the need for a distinction between consonant and dissonant sonorities. These two conditions may be further distinguished by their influences on small- and large-scale structure. The first condition concerns small-scale relationships (individual pitches and pitch collections) and the second condition concerns large-scale relationships (hierarchy among scale degrees). Väisälä determines that the consonance-dissonance condition is based on chord construction. That is to say, the referential sonority's intervallic content is the determinant of the consonant or dissonant status of all other sonorities. In tonality, certain triads are considered more consonant than others because of their intervallic content, a fact that identifies some sonorities as more structurally significant than others. An example is the inherent stability of the major or minor tonic triad compared to the relative instability of the dominant seventh chord.

In citing Straus's consonance-dissonance condition's relation to chord construction, Väisälä effectively generalizes its basic premise to include non-tonal harmonies. The degree to which sonorities may be considered consonant is dependent upon their similarity to the referential sonority. For Väisälä, subsets and incomplete forms of the referential sonority may be considered consonant (Väisälä 2004, 100), while



forms of the referential sonority that contain altered chord construction are considered less consonant. Deviation from the normative construction of the referential sonority creates dissonant sonorities, but Väisälä also observes that these dissonant sonorities may become “locally referential” at which point they too may be prolonged at lower levels of structure (Väisälä 2004, 43).

Väisälä goes further by generalizing the scale degree condition, considering it to be based on the process of chord transposition. Väisälä conceptualizes Straus’s scale-degree condition in a post-tonal sense by drawing an analogy between the function of scale degree hierarchies within the diatonic scale in tonal music and the transposition of pitch-class sets in post-tonal music. The argument is that the differences between harmonies built on scale degrees of the diatonic scale come about because of their membership in the overall collection and that the basic relationship between them is still essentially transpositional in nature (Väisälä 2004, 42-43 [62]). This can be further distilled to the idea that scale degree hierarchy is a product of transposition of an initial sonority. For instance in tonality a dominant triad spelled G-B-D could be considered a  $T_7$  transposition of the tonic triad spelled C-E-G. Väisälä extends this concept to post-tonal repertory, with the referential sonority of each individual piece representing the most structurally significant “scale degree,” with transpositions of it being hierarchically lower degrees.

Permitting this extension of scale-degree theory to post-tonal repertory, the question remains as to how a transposed instance of a referential sonority may be

distinguished from the “true” primary sonority. Väisälä explains the tonal scale degree system (in terms of Schenkerian theory) as being ultimately based on elaboration of the tonic triad through the I-V-I bass arpeggiation. The tonic and dominant are the most structurally significant scale steps, while others such as II, III, and IV are intervening scale steps that prolong either I or V. In non-tonal works this system does not prevail and Väisälä approaches this problem by citing two factors that play a part in the perception of relative weight between scale degrees (Väisälä 2004, 52). The inclusion factor is pitch-based and relates to the fact that the pitches of the bass arpeggiation I-V-I are all contained within the tonic triad but not all in the dominant triad, making the dominant sonority subordinate to the tonic. The temporal factor supports the tonic as structurally superior because it appears more often in time in the common I-V-I configuration. Temporality as an indication of structural weight is not a new notion and was cited by Travis in support of his Stravinsky analysis detailed earlier (Travis 1959, 266). The two factors of inclusion and temporality can extend rather easily to include non-tonal sonorities and can support analyses that find large-scale motion between a primary and secondary sonority. Once such a hierarchy has been established a system of scale degrees unique to a musical work may emerge.

The concepts of chord construction and chord transposition combine to form what Väisälä calls a “system of gradated consonance” (Väisälä 2004, 43). In this system consonance and scale-degree hierarchy are conceptualized through not only transposition of the referential sonority, but also through variance in the construction of the referential

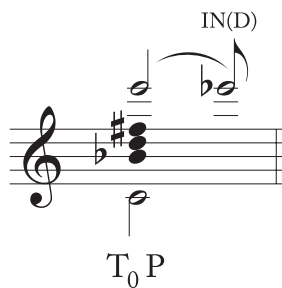
sonority. These “variant harmonies,” derived from transposition and alteration of the primary sonority, are considered comparatively dissonant in their large-scale structural interaction with the primary sonority. However, they may also become “locally referential” and create their own scale degree hierarchies closer to the surface of the music (Väisälä 2004, 43). In tonality this is akin to the local prolongation of any sonority besides the tonic triad. According to this explanation, Väisälä suggests that the two Straus conditions concerned with harmonic stability (conditions 1 and 2) may be sufficiently generalized to apply to non-tonal sonorities as long as the conditions are not adhered to rigidly. In most cases the context of a particular piece must be taken into account in order to effectively apply the concepts of chord construction and chord transposition—and therefore to satisfy the consonance–dissonance and scale degree conditions—in a prolongational analysis.

Väisälä generalizes Straus’s third and fourth conditions (the embellishment condition and harmony/voice leading condition) by explaining them as both being concerned with the interpretation of melodic motions. In his critique of the third and fourth conditions Väisälä observes that the two are interrelated, nearly to the point of being indistinguishable (Väisälä 2004, 44). Both conditions address the need for consistency in melodic figuration, but the third condition concerns the relative structural status of tones within embellishment figures—the difference between structural and embellishing tones—while the fourth condition concerns the distinction between arpeggiation and voice-leading intervals without regard for structural status. Väisälä’s

treatment of the third condition involves the extension of conventional embellishment figures from tonality without any necessary relationship to the referential sonority, whereas the fourth condition is related to the structure of the referential sonority and the proximity principle discussed earlier in relation to Lester. Lester's proximity principle involves the threshold between stepwise motion and chordal skips, a concept that will be explored further.

The embellishment condition requires that tones of greater or lesser structural weight be distinctly identifiable through a consistent set of relationships. In conventional tonality embellishments involving tones of greater structural weight are generally identified as arpeggiations or chordal skips, while embellishments involving tones of lesser structural weight will typically be such types as passing, neighboring, and incomplete neighboring motions. Väisälä maintains these conventional embellishment types in his prolongational analyses with one addition: the dimming tone. According to Väisälä a dimming tone is “an incomplete neighbor that occurs after the main tone and lies a semitone lower,” effectively “articulating the endpoint of the temporal presence of the main tone while prolonging it in a more abstract sense” (Väisälä 2004, 101). The dimming tone may seem indistinguishable from an escape tone (ET), and certainly the two embellishments share particular features, but the dimming tone is qualified by stricter conditions such as its situation below the main tone. The conception of the dimming tone is also very similar to Forte's concept of “qualifying tones” discussed earlier (Forte 1955, 81-82). In Väisälä's analyses the dimming tone is labeled IN(D) as in Ex. 13. In

Väisälä's theory, the dimming tone, based on embellishments observed in compositions by Debussy, Webern, and Berg (including op. 2, no. 2), is the sole departure from the categories of typical embellishments found in tonality (although the restriction of octave equivalence necessitates adjustments to certain conceptions of passing and neighboring tones, which is discussed later).



Ex. 13. A post-tonal embellishment called a dimming tone.

The harmony/voice leading condition concerns the distinction between intervals regarded as harmonic (i.e. the result of arpeggiation) and intervals that are products of voice leading (i.e. the result of linear motion between chords). Here we return to the topic grappled with in Lester 1970, but where Lester chooses to rely on the proximity principle to govern the differences between steps and leaps in atonal music, Väisälä proposes that the referential sonority of a piece and the proximity principle both interact to define these distinctions. In general, harmonic motion is by leap while voice-leading motion is by step. In tonal music chordal intervals generally include thirds, fourths, fifths, and sixths while tones and semitones constitute motion between chords. Väisälä

generalizes this principle by stating that harmonic intervals will be present in the referential sonority while voice-leading intervals will be absent from it (Väisälä 2004, 101). Thus the difference between harmony and voice leading will be dependent upon the construction of the referential sonority.

Based on these interpretations of Straus's four conditions of prolongation, Väisälä describes an analytical method supported by four corresponding principles. These principles provide theoretical support for post-tonal prolongational analyses that apply Väisälä's generalized renditions of Straus's four conditions. Justification for these principles is based partially on psychoacoustical research on perception. It is outside the purview of this thesis to delve too deeply into the psychoacoustic particulars of these justifications, but some aspects of the perceptual bases of these principles will be discussed as needed.<sup>9</sup>

(1) The first of Väisälä's theoretical principles is the concept of registration as a functional determinant. Earlier it was stated that Laufer's second guideline holds that a referential sonority will be presented in a consistent register (p. 22). Väisälä expands upon this idea in his theory of post-tonal prolongation by enforcing restrictions upon octave equivalence. Referential sonorities are analyzed on the basis of pitch rather than pitch class and functional identity is dependent on registration. Function and structural weight are thus determined by pitch content and the registral arrangement of those pitches. The concept is not foreign to conventional tonality; the same principle is embodied in triadic

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<sup>9</sup> The perceptual and psychoacoustic explanations referenced in Väisälä 2004 are derived primarily from Plomp and Levelt 1965, Terhardt 1974 & 1984, and Parncutt 1988.

inversions such as  $\frac{6}{3}$  and  $\frac{6}{4}$  chords, which have varying functional status based on the registration of their constituent pitches (Väisälä 2004, 61-2). This model offers a degree of flexibility that aids in satisfying Straus's consonance-dissonance and harmony/voice-leading conditions. As Straus noted in his evaluation of Travis's analysis of Schoenberg Op. 19/2 (Straus 1987, 8-10), the referential sonority that Travis identifies is so large that it contains every interval class. With such an intervallic make-up it is impossible to differentiate consonance from dissonance and harmonic intervals from voice-leading intervals on the basis of interval classes alone. Placing a restriction on octave equivalence offers a theoretical basis for granting functional distinction to large referential sonorities (Väisälä 2004, 62). Under this model of registral restriction, cases where prolongational analyses do not satisfy Straus's (originally conceived) conditions may be reexamined.

Concerning Travis's Schoenberg op. 19/2 analysis (Ex. 10), an earlier observation stated that the  $G\flat/F\sharp$  bass embellishment in mm. 2-6 functions as both a chord member of and an embellishment to the referential sonority. More importantly, it was found that this reading could not pass Straus's conditions because there was no clearly defined system or set of conditions to explain these disparate functions. Väisälä's model of registral restriction offers an explanation for the differences in function. The  $G\flat/F\sharp$  as a chord tone lies in the  $c^2$  octave, while its manifestation as an embellishment invariably lies outside of this register (Ex. 10). With octave equivalence restricted, the difference between consonance and dissonance can be defined more effectively, and can provide

theoretical support to a prolongational analysis by satisfying Straus's conditions (especially conditions 1 and 4).

In order to convey the model of registral restriction analytically, Väisälä employs the concept of the registrally ordered interval (ro-interval) in place of interval classes. Ro-intervals are calculated by a mod12 semitonal interval system similar to that used in musical set theory and twelve-tone composition, with the exception that they represent the number of semitones between registrally adjacent pitches in a vertical sonority. The ro-interval model differentiates between intervals related by inversional equivalence, such as major seconds and minor sevenths, allowing eleven possible ro-intervals, numbered 1-11 (Väisälä 1999, 232). Conversely, corresponding simple and compound intervals such as minor seconds and minor ninths are considered equivalent under the ro-interval model. Ex. 12 shows Väisälä's notational conventions for representing ro-intervals. Travis's "tonic sonority" is shown with its ro-intervals to the right. When considered as a registrally-ordered pitch set Travis's "tonic sonority" consists of intervals larger than a whole step, which allows it to more easily conform to the consonance-dissonance condition.

(2) As stated earlier, the proximity principle of voice leading states that smaller intervals tend to be voice-leading intervals while larger intervals tend to function as arpeggiations (Väisälä 2004, 13). Väisälä associates this principle with the related perceptual process of auditory streaming. Streaming is the tendency of the human ear to group certain musical textures into simultaneous streams (Väisälä 2004, 87). This is, for



The image shows a musical score for a piano triad in G major. The treble clef staff contains three notes: G4 (fingered 4), A4 (fingered 3), and B4 (fingered 4). The bass clef staff contains one note: G3 (fingered 4). A brace on the left groups both staves. Below the staves, the text 'T<sub>0</sub> P ro-interval' is written.

Ex. 14. Väisälä's concept of ro-intervals.

example, the perceptual basis that allows the ear to perceive a compound melody as such. The wider the interval between two pitches, the more readily the ear segregates them into separate streams. The closer two pitches are, the less the effect of streaming becomes. It is in this way that the concept of streaming relates to the proximity principle of voice leading.

The borderline at which auditory streaming begins is somewhere between two and three semitones, which approximately corresponds to the boundary between steps and leaps as provided by the proximity principle of voice leading. Väisälä asserts this correspondence as a guideline for distinguishing between harmonic and voice-leading intervals in post-tonal music. Straus's consonance-dissonance and harmony/voice leading conditions (1 & 4) are intrinsically linked in the tonal system because of the close correlation between consonance and harmonic intervals; harmonic intervals tend to be consonant while voice leading intervals tend to be dissonant. Because post-tonal referential sonorities often contain small intervals, it is helpful to loosen this correlation.

Whereas the restriction of octave equivalence offers expanded possibilities for distinguishing between consonance and dissonance, the proximity principle of voice leading allows a distinction between harmony and voice-leading intervals that is not dependent on the question of consonance and dissonance. This means that, theoretically, a small interval belonging to a referential sonority can function as a consonance while a compound interval of a related interval class could function as a voice-leading interval depending on the context and registration. In terms of analytical practice, Väisälä expands the concepts of passing and neighboring tones to include h-neighbors and h-passing tones, denoted N(H) and PT(H) respectively, with “H” standing for “harmonic” (Väisälä 2002, 219). These newly conceived embellishment types stem from the restriction of octave equivalence and generally appear as non-harmonic tones that share an octave relationship with harmonic tones (Ex. 15).

Ex. 15. (a) The h-neighbor and (b) h-passing tone.

(3) Rootedness is defined as the tendency for a bass tone to be perceived as a root if the intervals it forms with the pitches of its upper voices are similar to those that lie between a fundamental and its harmonics (Väisälä 2002, 209). The perceptual basis for rootedness, known as virtual pitch, is a psychoacoustical phenomenon whereby the combination of certain pitches may evoke the sound of an absent fundamental lying below those heard pitches (Väisälä 2004, 72). Bass-related intervals that correspond closely to tones of the harmonic series are considered root supports that increase the property of rootedness in a harmony (Väisälä 2004, 68). In Väisälä’s theory these root supports encompass only the first eleven harmonics of the overtone series. Väisälä uses another semitonal mod12 numbering system, similar to interval classes and his ro-intervals, to denote these root supports as registrally ordered intervals above a bass, which he calls fb-intervals (“fb” for figured bass). Ex. 16a shows these root supports labeled as bass-related ro-intervals (fb-intervals) to the right of the chord (7, 4, 10, 2, 6)<sup>10</sup> with the corresponding harmonic numbers in italics on the left. A prime sonority will be labeled T<sub>0</sub>P. The root supports lie on a continuum of how much they increase rootedness, with the lowest harmonic intervals giving strong support and the higher harmonics giving weaker support. The system Väisälä uses also allows for pitches that do not correspond to the harmonic series. Pitches missing from a chord otherwise related to a primary sonority are parenthesized (Ex. 16b); pitches added to a sonority have a “+” symbol in front (Ex.

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<sup>10</sup> In Väisälä’s system of labeling 0 denotes unisons and octaves of the fundamental. As with all ro-intervals, compound intervals are reduced mod12.

16c); pitches that are replaced by another fb-interval will appear in parenthesis behind the number of the added pitch (Ex. 16d).

(a) (b) (c) (d)

5 4 3 7      4      4 7      4 7

$T_0 P$        $T_0 P^{(7)}$        $T_0 P^{+9}$        $T_0 P^{+9(10)}$

Ex. 16. Väisälä's notation system for expressing fb-intervals and root supports.

The analytical advantage of Väisälä's concept of rootedness is that a graded system approximating scale-degree hierarchy may emerge when comparing post-tonal harmonies with the harmonic series. The possibility of assorted root supports combined with the array of possible upper-voice configurations provides a continuum of structural weight. Combine this further with Väisälä's concept of registration as a functional determinant and the prospects for satisfying Straus's first and second conditions in a post-tonal analysis begin to increase further.

(4) Similar in concept to the proximity principle of voice leading, the proximity principle of spacing concerns the avoidance of small intervals in post-tonal referential sonorities. In general, a harmony that excludes semitones and whole tones as harmonic

intervals will be more likely to comply with the consonance-dissonance and harmony/voice leading conditions (Väisälä 2004, 52). The perceptual basis of this principle is known as critical band, or the barrier at which two simultaneous tones will begin to sound “dissonant” (Väisälä 2004, 70). The width of the critical band is generally a minor third, although this barrier widens at lower frequencies. The correlation between the spacing principle and the voice-leading principle is apparent: the voice leading principle distinguishes arpeggiations from voice-leading intervals and the spacing principle distinguishes chord tones from dissonances (Väisälä 2004, 72). In practical terms, the proximity principle of spacing appears most useful as a guideline for identifying post-tonal referential sonorities and for recognizing non-structural sonorities that may connect them.

The practical result of Väisälä’s theoretical formulations is a sufficiently general system for addressing the analytical issues in post-tonal music raised by Strauss’s conditions of prolongation. If the section devoted to Väisälä’s theory of post-tonal prolongation seems disproportionate to the rest of the survey it is because that theory represents the “state of the art” regarding this type of analysis. All of the efforts surveyed here have left some analytical mark and have contributed to an accumulation of theoretical insight aimed at a singular analytical goal—prolongation in post-tonal music—but a large portion of the theoretical groundwork on this topic has come relatively recently, especially in the works of Strauss, Laufer, and Väisälä. Indeed, Väisälä’s theoretical formulations in particular exemplify an exhaustive rigor that builds upon all of

the previous analytical work on post-tonal prolongation. Even as generalized as Väisälä's theory may be for applications to post-tonal repertory, the theory is generalized only to a certain degree at which point piece-specific elements must be infused into the analytical method. In light of this fact and in the course of the following analysis, all of the previously investigated methodologies are applied in a manner that is sensitive to the context of the individual work—not a new stipulation in post-tonal analysis, to be sure. In order to continue the scholarly inquiry into this topic it is my intention that the analysis should contribute to the analytical literature on post-tonal prolongation by making use of the many analytical methods and theoretical concepts presented in this survey as they relate to the structure of Alban Berg's Op. 2 song *Warm die Lüfte*.

### CHAPTER 3

#### ANALYSIS OF ALBAN BERG'S *WARM DIE LÜFTE*

Alban Berg wrote his op. 2 songs during the period between 1908 and 1910. The first three songs are extensions of the German late-romantic style Berg had composed within up to that point, and the songs harbor extended chromatic and even atonal elements within a tonal foundation. The fourth song (Ex. 18) marks a break with this style by taking on a much more “atonal” character. Tonal elements exist within the fabric of the piece, but they no longer form the foundation.

#### Structure of the Primary Sonority

My analysis is based on the prolongation of chord P (“primary”) in Ex. 19a. This chord, which first appears prominently in the opening and closing measures of the first op. 2 song, *Dem Schmerz sein Recht*, contains a few characteristic elements that support its status as the referential sonority of song 4, *Warm die Lüfte*. The strongest stabilizing feature of this sonority and its related chords is the bass interval of a fifth. According to Väisälä’s principle of rootedness, when voices above a bass form an interval structure that closely resembles that of the overtone series, those upper-voice pitches are considered root supports. Root supports reinforce the tendency for a bass pitch to sound like the root of a chord. The lower pitches in the overtone series give stronger support than the upper pitches, making the bass-related perfect fifth the strongest possible root-supporting interval. The full form of chord P also contains the fb-intervals 7, 4, 10, and 3

above its bass (B#). Again, because of this root-supporting upper-voice structure there is a strong tendency for the B# in the bass to be heard as a root. This tendency is a result of the close correlation between the bass-related intervals of the primary sonority and the harmonic structure of the overtone series. A comparison of Ex. 17a and 17b demonstrates how closely the fb-intervals of chord P are aligned with the first five odd harmonics of the overtone series. Although the primary sonority's overall ro-interval structure displays a close correspondence to the harmonic series, one exception lies in the presence of fb-interval 3. The combination of fb-intervals 3 and 4 (D and E") creates a split third above the B#.

(a) Odd harmonics: A piano score showing the first five odd harmonics of the overtone series. The treble clef has notes 11 and 6, and the bass clef has notes 7, 5, 3, and 1. The notes are grouped into pairs with interval numbers 2, 4, 6, and 10.

(b) T<sub>0</sub>P: A piano score showing the primary sonority of *Warm die Lüfte*. The treble clef has notes (9) and 3, and the bass clef has notes 7, 5, 3, and 1. The notes are grouped into pairs with interval numbers 4 and 10.

Ex. 17. Comparison of (a) the first five odd harmonics of the overtone series, and (b) the primary sonority of *Warm die Lüfte*.

While fb-interval 3 lies outside of the first eleven harmonics of the overtone series—and thus outside the class of root supporting intervals—the juxtaposition of major and minor forms a link with the subtext of duality inherent in the song (i.e. “The one dies



while the other lives,” major/minor, tonal/atonal). Within this context the link is relevant enough to favor reading fb-interval 3 as a harmonic interval in the primary sonority. The presence of the bass fifth, the root supporting ro-intervals between the upper voices, and the split third between fb-intervals 3 (D) and 4 (E $\flat$ ) are all characteristic features of the primary sonority. Variations of this basic structure are also found at important structural points in the song and are labeled using Väisälä’s method for notating added and missing pitches as described earlier (Ex. 16). Much like inversions of the tonic triad in tonal practice, these variations will be considered structurally inferior to the fully formed chord P found in m. 22. All chords that show little similarity to the structure of the primary sonority will be labeled as secondary harmonies (S). Conceiving of the harmonic landscape of the piece as a continuum of P-related sonorities spanning the range between the most consonant (P) and the most dissonant (S) provides a system of gradated consonance that can aid in determining prolongational structures.

#### Determining the Primary Sonority

The primary sonority (P) has been determined according to elements of Laufer’s first two guidelines, elements that include formal placement and registral positioning. The song’s form closely corresponds with the three-stanza scheme of Mombert’s poem. Although the song is through composed, the first and third sections share some harmonic elements. The first section is characterized by the persistent bass fifth figure that defines the primary sonority and other related chords. The second section moves away from this harmonic plan and the third section eventually returns to the stability of the bass fifth as

part of the primary sonority (chord P). This formal correspondence with elements of the primary sonority conforms to Laufer's second guideline, which states that a referential sonority will be found at key structural areas. Another element of Laufer's second guideline holds that changes in register often mark arrivals as important structural points such as cadences. This concept can be further applied to harmonic shifts. In m. 4 the B $\flat$ /F $\sharp$  tritone on the last beat between the bass and vocal line is subtly disrupted by the nightingale's call on F $\sharp$  (fb-interval 7 above the bass B $\flat$ ). The F $\sharp$ , flying high above and out of reach, is three octaves removed from the B $\flat$ , a mere hint at its position in the full form of chord P at the song's close. In this case the extreme change in register renders the otherwise strongly root supporting fb-interval 7 as relatively impotent as a stabilizing force. This focus on the tritone is an ongoing technique that draws the harmony away from the stability of the primary sonority throughout the composition.

As Laufer's second guideline also indicates, endings are especially salient points at which a primary sonority may be found. Indeed, the occurrence of the primary sonority is emphasized by several elements such as the preceding descending fifths progression in mm. 20-22 and the arrival of the chord tone E $\flat$  in the vocal line in mm 22. The E $\flat$  in particular is made prominent by its emphatic duration and registral placement, both features that also correspond with Laufer's first and second guidelines respectively.

The song's middle section begins in m. 7 with the repeated tritone A $\flat$ /E $\flat$  in the accompaniment, while the vocal line contrasts it with melodic perfect fifth intervals, G $\flat$ /D $\flat$  and C $\sharp$ /G $\sharp$ , at each end of the phrase encompassing the line "Ich will singen." In

m. 9 there is a transposed statement of chord P containing an added fb-interval 1, the “purest” form of the primary sonority yet heard. Despite this strong statement of a chord P derivative early in the middle section, the harmonic plan quickly shifts to form an area of contrast and motion away from the stabilizing force of the primary sonority. Beginning at m. 12 the bass fifth F#/C# expands to a major sixth F#<sub>4</sub>/D#<sub>4</sub> initiating a wedge progression that continues until the dramatic glissando figure at m. 15.

#### Elements of the Vocal Line

The song is composed primarily in a melody-accompaniment texture, with less motivic interplay between voice and piano than is found in the first three op. 2 songs. Consequently much of the harmonic structure is confined to the piano part. The freely embellished vocal line reflects the overall atonal character, but key points of emphasis in the melody often serve to accentuate the song’s structural underpinnings. Vocal line pitches highlighted in this analysis are chosen primarily on the basis of how their bass-related intervals correlate with the fb-intervals of the primary sonority, and secondarily on the basis of contextual clues such as rhythmic emphasis, phrasal placement, and registration.

It has already been discussed how the E<sub>4</sub> in the vocal line at m. 22 is emphasized in such a way as to mark the arrival of the primary sonority. It should also be noted that the E<sub>4</sub> is considered harmonic even though it lies an octave above the “obligatory register” of the E<sub>3</sub> found in the primary sonority. This reading takes into consideration the cadential nature of the motion to the primary sonority in mm. 21-22, which is created by

the strong close at the end of the descending fifths progression in mm. 20-22 and by the emphasis placed on the E $\flat$  in the vocal line in m. 22. In such a case the restriction on octave equivalence may be relaxed to conform to a particular musical idiom. The change of register of fb-interval 4 from an inner voice—such as in chords found in mm. 9, 12, and 20—to the main melody note is also in accordance with Laufer's contention that changes in registration often mark important structural points such as cadences (Laufer 2004, 133-134).

#### Prolongation of the Primary Sonority

Taking into account the proximity principle of voice leading (pp. 31-32) and the restriction on octave equivalence (pp. 29-31), the bass-related interval structure of the primary sonority may act as a guide to understanding a system of consonance and dissonance in the song. Ex. 19a-19e show the various levels of structure in the Berg song. In general, and for the purposes of this analysis, any pitches that create bass-related intervals that match that of the primary sonority (7, 4, 10, and 3) are considered consonant. Bass-related intervals 1 & 11 are considered most dissonant based on both the proximity principle and their absence from the primary sonority. For the same reasons, interval classes 1 and 11 are generally considered voice-leading intervals rather than harmonic intervals. Exceptions to this include cases of melodic motion between chord tones a semitone apart, such as two pitches that create fb-intervals 3 and 4 as part of chord P. Other non-chord tones may include pitches that form fb-intervals 2, 5, 6, 8, and 9. Pitches that are dissonant in the context of chord P may be analyzed as chord tones of

III.

Alban Berg, Op. 2, No. 4.

Langsam.

Warm die Lüfte, es sprießt Gras auf sonnigen Wiesen, Horch!  
nicht zu nehmen

Horch es flötet die Nachtigall.

Ich will singen. Droben hoch im düstern Bergforst, es

*f* *langsameres Tempo*  
 Ich will singen. Droben hoch im düstern Bergforst, es

*poco rit.* - - - *Noch langsames Tempo*  
 schmilzt und glitzert kalter Schnee, ein Mädchen in grauem Kleide lehnt an feuchtem  
sehr ausdrucksvoll

*spitz* *mf* *spitz* *p* *schwach betont.*

<sup>o</sup>) Der Vorschlag ruhig und langsam zu nehmen!

Eichstamm, krank sind ihre zarten Wangen, die grauen Augen fiebernd durch

Düsterriesenstämme. „Er kommt noch nicht.“

Er läßt mich warten.“ Stirb! Der Eine

stirbt, daneben der Andre lebt. Das macht die Welt so tief schön.

*acc.* *rit.* *ff* *gliss.* *Rit.* *Accel.* *molto* *sfz* *molto rit.* *ganz langsam* *p dolce* *schleunig* *kurzer Halt.* *pp* *espress. mf* *ppp*

Ex. 18. Berg, Warm die Lüfte, Op. 2, No. 4.

(a) (b) (c) (d)

m. 1 22 1 9 20 22 1 9 12 15 20 22

$T_0P$   $T_1P_{+5(4)+1(3)}^{+8}$   $T_0P$   $T_1P_{+5(4)+1(3)}^{+8}$   $T_8P^{+1}$   $T_{11}P_{(7)}^{+9}$   $T_0P$   $T_1P_{+5(4)+1(3)}^{+8}$   $T_8P^{+1}$   $T_7P$   $S$   $T_{11}P_{(7)}^{+9}$   $T_0P$

(e)

m. 1 4 6 9 12 13 15 19 22 24

$T_1P_{+5(4)+1(3)}^{+8}$   $S$   $-$   $T_1P_{+5(4)+1(3)}^{+8}$   $T_8P^{+1}$   $T_7P$   $S$   $S$   $T_{11}P_{(7)}^{+9}$   $T_0P$

Ex. 19. Prolongational sketches of Berg's *Warm die Lüfte*.

secondary harmonies (S). In these cases fb-intervals other than those of the primary sonority may be considered locally structural as related to a secondary harmony. Thus in the midst of a prolongation of a secondary harmony the consonant fb-intervals of the overall structure (7, 4, 10, and 3) may be considered dissonant in the context of that local prolongation. One distinction is made regarding the set of dissonant fb-intervals. In some circumstances the perfect fourth (fb-interval 5) may be considered a structural interval. Cases where fb-interval 5 is read as a consonance include local prolongations of the bass fifth where the fourth functions as an inversion and linear projections of fb-interval 5 as an inverted form of fb-interval 7 that occur in the bass and melody lines.

As a supplement to Väisälä's principles of post-tonal prolongation, and to maintain sensitivity to the context of this particular musical work, I will invoke a threshold of similarity to mark the boundaries between chords considered structurally consonant or dissonant. The threshold of similarity is defined as the number of chord tones that must be present for a harmony to be considered similar to either chord P or a secondary harmony (S). The threshold lies generally at three chord tones for chords with four to six pitches, or roughly somewhere between  $\frac{3}{4}$  and  $\frac{1}{2}$  of a chord's pitch content. An exception is made for the bass fifth because of the importance of its particular structural role in this song. The presence of the bass fifth may override the threshold of similarity and retain status as a relative of chord P based on the strong root supporting status of the (non-compound) perfect fifth interval. Conversely, a chord without a bass fifth structure may contain enough fb-intervals in common with chord P to warrant it

being considered a structural relative of chord P, although any P-related sonority without the bass fifth is considered to have less inherent structural weight.

The fundamental structure of Berg's song is the connection between the first P-related sonority in m. 1 (transposed by  $T_1$ ) to the full appearance of chord P near the close of the song in m. 22 (Ex. 19b). The first chord's structural status rests on the bass fifth and fb-interval 10, a shell voicing<sup>11</sup> of the primary sonority that appears frequently. The first small-scale prolongation of chord P occurs at m. 4 where the stable bass fifth is disrupted by a leap of a tritone from C to F#. In this song the tritone is a signal of harmonic departure and appears often as both melodic and harmonic intervals around such events. The chord on beat one of m. 4 is a secondary sonority due to its lack of a bass fifth and the number of non-chord P fb-intervals in its upper voices. The prolongation of chord P encompasses the chromatic ascent from F# to B $\natural$ , a fourth span, before returning to the C $\natural$  of the initial chord P. The mechanisms of this small-scale prolongation are the fourth span in the bass and the temporal factor of the motion away from and return to chord P in mm. 3-5.

The primary sonority at m. 5 is weakened by the dissonant upper voices, but remains related to chord P because of the exception to the threshold of similarity afforded the bass fifth based on its unique structural role in the song. At m. 6 the arrival of the E $\flat$  in the vocal line helps strengthen the primary sonority until the programmatic swooping of the nightingale in the accompaniment draws the harmony away from chord P and into

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<sup>11</sup> The term "shell voicing" is borrowed from jazz nomenclature, and denotes a chord voicing that omits certain tones.



a short interlude marking the end of the first section. This interlude from the end of measure 6 to the beginning of measure 9 is infused with the tritone  $A\sharp/E\flat$  in the accompaniment, but the vocal line unfolds fifths at both ends of its phrase (“Ich will singen...”). This unfolding of fifths in the vocal line is an example of a structural element (the bass fifth) moved from its normative position, highlighting a change in the harmonic plan and in this case prolonging the stabilizing quality of the bass fifth in an otherwise dissonant interlude.

In m. 9 the second section begins with a complete version of the primary sonority transposed by  $T_8$  and containing the added fb-interval 1. The registral ordering of the upper voices of this chord are highly similar to those of the final version of chord P, making it a structural step in the prolongational middle ground of the work (Ex. 19c). The first four measures of the middle section (mm. 9-12) contain other instances of P-related chords until the bass fifth  $F\sharp/C\sharp$  in m. 12 expands to fb-interval 9 with  $F\sharp/D\sharp$  in the bass. This expansion initiates a wedge progression that leads to the climax in m. 15 and embodies the shift away from the stabilizing force of the primary sonority. Indeed, the section in mm. 13-17 is devoid of P-related chords. Though some of the chords in this section contain fb-interval 7, it often appears as a passing tone and in every case is relegated to an upper voice instead of its structural bass fifth position in the primary sonority.

The climactic glissando figure at m. 15 is the point of furthest remove from the harmonic stability of the primary sonority. Yet in this instance the unfolding of interval-

class 1—essentially a consonant interval in the secondary chord in m. 15—occurs between the pitches E $\sharp$  and F $\sharp$  in the vocal line, which themselves create fb-intervals 3 and 4 above the bass C $\sharp$ . Here at the most remotely related harmonic region of the entire song the split third of chord P is emphasized by a registral shift between the E $\sharp$  and the F $\sharp$  that matches the registral positioning of fb-intervals 3 and 4 in the fully formed chord P of m. 22. This unfolding completes the prolongational span in the melody from the F $\sharp$  in m. 9 to the F $\sharp$  in m. 15. At the same time the bass motion by tritone from the G $\sharp$  in m. 9 to the C $\sharp$  in m. 15 underpins the secondary harmonic nature of most of the middle section. Thus the secondary chord (S) on the last beat of m. 15 may be considered locally structural within the harmonic plan of the middle section (see Ex. 19d), but functions as a prolonging melodic and bass figure in the scheme of the entire song.

The end of the middle section is punctuated by the entrance of a whole-tone collection in m. 17, an allusion to the whole-tone character of the second op. 2 song. The descending figure in m. 17 then drives toward the B $\flat$  of the next measure that begins the third section. The lone B $\flat$  is eventually joined by upper voices in the accompaniment, a structure consisting of fb-intervals 4, 9 and 10. Well within the threshold of similarity this chord is related to chord P at a transposition of T $_{11}$ . What follows is a descending fifth progression in the bass accompanied by chromatically descending chords in the right hand. The chords in mm. 20-21 alternate between two forms of chord P, one without fb-intervals 3 and 7 and an added fb-interval 9, and one with all chord tones save fb-interval 7, which is finally regained in its bass fifth form at the entrance of the full chord P in m.

22. Here the prolongation of the primary sonority is accomplished as the B $\flat$  bass that enters in m. 18 functions as an incomplete neighbor to chord P's B $\sharp$ . The larger background motion of overall prolongational span of mm. 1-22 is thus a descending half step in the bass from C $\sharp$  to B $\sharp$ , and a descending perfect fifth in the melody from B $\flat$  to E $\flat$ .

The prolongational structures in *Warm die Lüfte* rest primarily upon the factors of registration, linearization, and contextual emphasis. Particular intervallic structures such as the bass fifth, the tritone, and the split third appear to play significant roles in the stabilization of both primary and secondary harmonies and in the prolongation of those harmonies through linear projection. The bass fifth functions as the predominant stabilizing force throughout the song and the registral reorientation of that interval is frequently used as a catalyst for a shift in its harmonic structure. Conversely, the tritone often functions as a foil to the stability of the primary sonority, appearing in areas governed locally by secondary sonorities. In specific points in the song, the fifth, tritone, and split third are all composed out as melodic intervals over time to effect the prolongation of primary and secondary sonorities, especially in areas where those sonorities are not locally structural. Contextual factors such as the temporal element of “statement/return” that is evident in the song’s form and emphasis placed on chord tones in the vocal line also play a role in prolonging the primary sonority. Most of the chords given structural status in the present analysis coincide with formal arrivals and occurrences of P-related intervals generated by the vocal line. Taken together, all of these

elements form a picture that supports the case for a single governing harmony as the structural basis for the song.

## CHAPTER 4

### CONCLUSION

The above analysis offers an implementation of the various theories and techniques of post-tonal prolongational analysis presented in my survey of theoretical literature on the topic. Through the combination and synthesis of these methods they are applied in such a way as to draw out relevant aspects of the structure of a particular work, in this case Berg's *Warm die Lüfte*. While the bulk of theoretical work in the particular area of post-tonal prolongation has been accomplished within the last half of the twentieth century, the general theories of prolongation and hierarchical structure as forces of musical organization are undoubtedly those of Schenker and it should be recognized that these methods are Schenkerian in nature if not in origin. The analytical observations and theoretical formulations of Salzer, Travis, Straus, Laufer, and Väisälä—to name a few—are all borne of Schenkerian principles that reflect the notion that structural organization in music is an organic process that grows from the basic musical materials themselves.

The coherence of any theory of post-tonal prolongation rests on the ability of that theory to be flexible enough to address various types of musical materials. Redefining tonality to include sonorities other than the triad is the first conceptual step toward that flexibility. Codifying generalized principles for defining piece-specific referential sonorities is the second step. The third step is to formulate general principles that may be

applied to any referential sonority, regardless of its structure. These three steps are established in the theoretical and analytical work of Forte, Travis, Laufer, and Väisälä, and the analysis of *Warm die Lüfte* is presented as a demonstration of these methodologies. The analysis shows that even with these analytical tools it may be necessary to devise principles and strategies that coalesce with the structure of a particular piece, and that is as it should be. This case-by-case handling of analysis in post-tonal music is not new, but the theoretical tools with which to sufficiently generalize a piece-specific analytical method are relatively new. The continuing use of such methods may prove vital in illuminating the structure of works from the post-tonal repertory.

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