Music theorists have long asserted that the material presented at the beginning of a piece often generates the overall form organically; the form is not simply a parsing of the music into sections. Traditionally, music theorists have focused on harmony and motive as the generative elements of form. Timbre, however, has not often been considered as generative, especially when harmony and motive are readily analyzable. While there is generally a consensus among theorists on analytical tools for harmonic and motivic analysis of music, there is little consensus on any facet of timbral analysis. This is due to its recent development as a practical theoretical field, its inherent complexity, its lack of visual representation on the traditionally notated musical score, and its lack of clear definition.

Building on previous work by Jean-Charles François, Judith Lochhead, Stephen Malloch, Danuta Mirka, and Lee Tsang, this study shows how musical forms can be generated from timbre generalizations that stand in opposition to each other. It proposes general formal types based on timbral centricity and timbral progression. It illustrates these forms through analyses of Joel Puckett’s It Perched For Vespers Nine, Steven Stucky’s Second Concerto For Orchestra, and my Symphony for wind
ensemble. While the pieces analyzed are also rich in form-generating harmonic content, it is revealed that some of the pieces' expressive power is rooted in the agreement or disagreement between concurrent formal plans generated independently by timbre and harmony.

INDEX WORDS: Music, Form, Timbre, Timbral Prolongation, Formal Dissonance, Joel Puckett, Steven Stucky
MUSICAL FORM AS GENERATED BY TIMBRAL OPPOSITIONS

by

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B.A., Georgia College, 2010
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A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF MUSICAL ARTS

ATHENS, GEORGIA

2015
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CHAPTER 1: INTRODUCTION

PURPOSE

Music theorists have long asserted that the material presented at the beginning of a piece often generates the overall form organically; the form is not simply a parsing of the music into sections. Heinrich Schenker’s assertion about Beethoven’s Ninth Symphony sums this idea up well: “In the beginning was content!”¹ Thus, the content blossoms into a life-like form, as opposed to being poured like concrete into a rigid formal foundation. Traditionally, music theorists have focused on harmony and motive as the generative elements of form. Timbre, however, has not often been considered as generative, especially when harmony and motive are readily analyzable. While there is generally a consensus among theorists on analytical tools for harmonic and motivic analysis of music, there is little consensus on any facet of timbral analysis. This is due to its recent development as a field, its inherent complexity, its lack of visual representation on the traditionally notated musical score, and its lack of clear definition.

My goal in this study is to channel the diversity of ideas on timbral analysis into a system of terms and concepts with which to discuss the topic. Drawing on musical examples from my Symphony for wind ensemble (dissertation composition) and other wind-centric large-ensemble works by Joel Puckett and Steven Stucky, I show how musical form can be generated from timbre generalizations that stand in opposition to each other, an idea similar, but not completely analogous, to the concept of opposing

harmonic functions, such as tonic and dominant. These timbral oppositions are analyzed through disparate descriptions, such as bright and dark, or metallic and wooden. Next, I propose two formal types based on how the relationships between timbre oppositions unfold in each piece. The pieces I analyze are also rich in form-generating harmonic content: it will be revealed that some of the pieces’ expressive power is rooted in the agreement or disagreement between concurrent formal structures generated independently by timbre and harmony.

LITERATURE REVIEW

The following discussion focuses on previous timbre research, which has been diverse in purpose, ideas, and conclusions, including the definition of timbre itself. Quantitative and qualitative strategies have been used to describe a range of analytical objects, from single sounds to entire pieces of music. Quantitative research has generally sought to provide evidence and geometrical models for how we hear and describe the “timbre space,” or the “multidimensional perceptual representation of timbre.” This evidence is often derived from experiments that require listeners to rate the similarity or dissimilarity between the sounds they hear. From these experiments, several systems of terminology for describing timbre have been proposed; however, no consensus has been formed. I must emphasize that my research is not a contribution to the scientific quantitative literature; however, my work is at least informed by the rigorous studies listed below. On a related note, while my study is informed by concepts associated with spectralism, I again stress that my work also does not aim to

contribute to that field. After my discussion of quantitative research, I list sources more relevant to my purposes. These analytical approaches propose formal structures by dividing pieces into sections according to differences in timbre through the use of a variety of quantitative measures and qualitative descriptions.

Stephen McAdams summarizes the experimental research done at IRCAM in his 1999 article, “Perspectives on the Contribution of Timbre to Musical Structure.” He begins by addressing the problem of defining timbre, describing it as a “misleadingly simple word that encompasses not only a very complex set of auditory attributes, but also a plethora of important psychological and musical issues.” He goes on to state:

a goal of the research program has been to determine the structure of the multidimensional perceptual representation of timbre (the so-called timbre space) for individual notes played by musical instruments, and then to attempt to define the acoustic and psychoacoustic factors that underlie this representation.

Modeling of the timbre space has often been done through multidimensional scaling techniques that, through experiments on listeners, measure perceptual distance between sounds. McAdams and his colleagues modeled the distance between timbres in three acoustic dimensions, including attack time, spectral centroid, and spectral flux. Spectral centroid is defined as “the center of gravity of the long term amplitude spectrum.” Spectral flux is “the measure of the degree of variation of the spectrum over time.” For example, the harpsichord is found at the short end of the dimension representing attack time, while the clarinet is found at the long end. The two

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4 McAdams, 85.
5 ibid., 85.
6 ibid., 85.
7 ibid., 90.
8 ibid., 90.
instruments also stand at opposite ends of the dimension representing spectral centroid, harpsichord at the high end, and clarinet at the low end.  

McAdams' paper then discusses how timbre space models may be useful beyond sound differentiation. Proposed concepts include perception of timbre intervals, timbre and auditory stream formation, and timbre and musical tension. The research into timbre intervals addresses the question of whether timbre transformations can be heard in a manner analogous to pitch transpositions. In an experiment, listeners had to resolve the analogy, Timbre A is to Timbre B as Timbre C is to Timbre D, by choosing the Timbre D that fit best from a set of candidates. The evidence suggests that perception of timbre intervals might be difficult with traditional sound sources, but more feasible with electronic sounds with fixable parameters. The investigation into timbre and auditory stream recognition examines how listeners tend to connect events in music that sound like they are coming from the same source. Experiments showed that sound sources far apart in the timbre space based on attack time, spectral centroid, and spectral irregularity work well to form separate streams. McAdams centers the discussion of timbre and musical tension around the concept of “roughness,” or “sensation of rapid fluctuations in the amplitude envelope.” Roughness correlates directly with harmonic dissonance, which causes beating in the sound. Evidence was found to suggest that timbral roughness plays a role in tension and release, and in turn, musical form.

Work in quantitative measurement has continued to the present. Much more work has been done in this field, including a 2011 study by Geoffroy Peeters, Bruno

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9 McAdams, 89.  
10 ibid., 94-95.  
11 ibid., 96.
Giordano, Patrick Susini, Nicolas Misdariis, and McAdams, entitled *The Timbre Toolbox*, which puts forth a rigorous and highly mathematical framework to evaluate a comprehensive set of audio descriptors used for timbre measurement.¹²

Some studies focus on measuring the perceptibility and exclusiveness of timbre adjectives based on quantitative data. One example is a 1993 article by Roger A. Kendall and Edward C. Carterette, entitled “Verbal Attributes of Simultaneous Wind Instrument Timbres II: Adjectives Induced from Piston's ‘Orchestration.’”¹³ The research was inspired by a 1974 article by G. von Bismark on the topic of creating scales of timbre measurement.¹⁴ Initially, an experiment was conducted in which listeners had to describe sounds according to a 61 term checklist taken from Piston. Only terms that were found to be most specific were retained, leaving 21 terms.¹⁵ Through another listening experiment, it was then found that most of the variation between the 21 terms could be expressed by four scalar categories: Power, Strident, Plangent, and Reed Factors.¹⁶ The Power Factor is represented on a spectrum from weak (mellow, weak, light, smooth, soft) to strong (strong, tense, tremulous). The Strident Factor is represented on a spectrum from negative (warm, full, round, rich) to positive (brittle, edgy, nasal). The Plangent Factor is also represented on a spectrum from negative

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¹⁶ ibid., 490.
(crisp, brilliant) to positive (ringing, resonant). The Reed Factor is represented by two terms, fused and reedy.\textsuperscript{17}

Several authors have aimed to analyze pieces of music by means of timbre, either through measurement or more qualitative methods. Stephen Malloch’s 2004 article, “An Exploration of Timbre Analysis: The Game of Sound in Two Performances of\textit{ Jeux Vénitiens},” uses quantitative timbre data to describe the formal structure of Lutoslawski’s orchestral work.\textsuperscript{18} Malloch defines timbre using the 1960 definition of The American Standards Association: “timbre is that attribute of auditory sensation in terms of which a listener can judge that two sounds similarly presented and having the same loudness and pitch are dissimilar.”\textsuperscript{19} Malloch states that the multidimensional idea of timbre can be described through measurements of width, roughness, and sharpness, and models their variation throughout the piece. Citing von Bismark, Malloch defines sharpness as the “measure of the frequency position of the loudness centroid,” or “where the center of the loudness lies in the sound.”\textsuperscript{20} Roughness, as in the aforementioned article by McAdams, is essentially the dissonance or “graininess” of a sound.\textsuperscript{21} Width (which ranges from focused to diffuse) is a measure of how broad we experience a sound to be. Malloch divides the first movement into alternating sections differentiated by disparate timbres. The A-textures involve woodwind, brass, and percussion, while the B-textures feature the strings. Malloch uses his timbre measures

\begin{thebibliography}{9}
\bibitem{17} Kendall, “Verbal Attributes of Simultaneous Wind Instrument Timbres,” 476.
\bibitem{19} ibid., 54.
\bibitem{20} ibid., 55.
\bibitem{21} ibid., 55.
\end{thebibliography}
to describe relationships between A sections and B sections, respectively (A sections are not compared to the B sections).  

A 2002 article by Lee Tsang, “Toward a Theory of Timbre for Musical Analysis,” proposes formal diagrams for parts of Schoenberg’s *Farben*. In a preliminary discussion of timbral dimensions, Tsang acknowledges both the quantitative and qualitative sides of the discourse about timbral description, citing the work of Malloch, McAdams, and Kendall and Carterette. Tsang concludes that “quantities themselves are superfluous and difficult to pinpoint for timbres in context; more important is the qualitative evaluation of a timbre’s general position within the dimensions in relation to other timbres.”

Tsang’s formal plans for *Farben* come out of a discussion of “timbral rhythm.” The author presents foreground, background, and combined models for timbral change using traditional rhythmic notation that shows the duration between changes. The foreground is representative of surface level timbral changes, while the background is formed by the most “dramatic” timbral events.

Another model of timbral formal analysis was proposed by Jean-Charles François in his 1991 article, “Organization of Scattered Timbral Qualities: A Look at Edgard Varèse’s *Ionisation*.” François’ analysis is based entirely on Varèse’s score, rather than quantitative measurement. In defining timbre, the author states that “Timbre itself is hard to define. It can only be measured as frequency (pitch), time evolution, and

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22 Malloch, 65-66.
24 ibid., 25.
25 ibid., 36.
26 ibid., 43.
loudness.” The author breaks the piece into three alternating structures, identified as I, II, and III, which he describes as “triangular opposing states.” These opposing structures interact with each other through “alternation, superimposition, and combination.” Structure I is primarily characterized by a “slow, rhythmic line shared between two opposite timbres (resonant low skins and resonant low metals).” Structure II involves the contrapuntal interplay between “fast, sharp, articulated sounds” with various decay times, and “alternation of opposite timbres (skins with snares, skins without snares, woods, and later, high metals).” Structure III is a “monophonic tutti, chorus-like and very loud in articulation, with a mixture of timbres (wood, metal, and skin).” According to François, the instruments within the structures interact in ways that mirror the large form.

Danuta Mirka’s 2001 article, “To Cut the Gordian Knot: The Timbre System of Krzysztof Penderecki,” presents a formal analysis of Polymorphia based on timbre. The study is based on the score, not quantitative measurement. Mirka describes timbre as the:

most complex parameter of sound perception… timbre depends on the interaction of several aspects of sound. These aspects include overtones, wave forms, sound pressure, transients, as well as the frequency of formants. Moreover, a sound’s frequency and intensity—parameters which relate basically to pitch and loudness—exert an influence on the resulting timbre.

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28 François, 76.
29 ibid., 52.
30 ibid., 54.
31 ibid., 49.
32 ibid., 51.
33 ibid., 51.
35 ibid., 435.
The author describes a system of timbre organization based on sound source categories, including sound inciters and sound vibrators. Mirka names five possible inciters, including metal, wood, leather, felt, and hair. She lists three vibrators, including metal, wood, and leather, which she call the "primary materials." The author claims that the syntax of the piece is "formed by a play of timbral oppositions between metal, wood, and leather." From this framework, Mirka presents a "timbral trajectory" chart that articulates a large-scale alternation of metal-wood-metal, or an ABA form.

Judith Lochhead’s 2006 article, “Texture and Timbre in Barbara Kolb’s Millefoglie for Chamber Orchestra and Computer-Generated Tape,” proposes a timbral analysis based largely on a qualitative description of sounds. Lochhead defines timbre as the “overall effect made by the quality of sound of a given sound source or a combination of sound sources.” Kolb’s composition includes electronics, which are not fully notated in the score. Lochhead chooses her method of descriptive aural analysis partly because of this lack of traditional notation. She explains that in the case of timbre analysis, the analytical tools must be “theorized,” stating that her work relies on “metaphorical descriptions that refer to sound qualities. This metaphorical descriptive terminology becomes the information on which an analysis is built.” Metaphorical descriptions are given for sounds such as “fuzzy sound,” “chase voice,” “murmur,” and “swish.”

Claiming that timbre and texture are difficult to separate in analysis, Lochhead

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36 Mirka, 437.
37 ibid., 447.
38 ibid., 450.
40 ibid., 254.
41 ibid., 256.
42 ibid., 262, 264.
describes the piece in terms of “Textural/Timbre Types,” labeled A, B, and C.\textsuperscript{43} Lochhead defines these T/T Types as “generalized types of textural/timbral relations that recur in variation over the course of the piece.”\textsuperscript{44} The occurrences of these T/T Types are labeled in a chart along with their internal instrumental variations. Lochhead articulates a large form for the piece based on the presentation and recurrence of the T/T Types, dividing the form into three parts: “presentation,” “transformation and intensification”, and “dissipation.”\textsuperscript{45} The presentation introduces each T/T Type. The transformation and intensification section features an acceleration of timbral change, and the dissipation exclusively features T/T Type A.

**METHODOLOGY**

My analytical method builds on, but also diverges considerably from the studies cited above. Chapter 2 of this study presents terminology and concepts with which to describe timbre, drawing on musical examples from my Symphony and Thomas Adès’ *Polaris*. The purpose of my terminology is not to create vocabulary for its own sake, but rather to provide a consistent framework for my discussion on form in Chapter 3. This framework includes descriptors of timbre and elements that can influence perception of timbre—including pitch, dynamics, articulation, and sound source—that are commonly used in informal discourse about sound quality. I use these score-based timbre descriptors to predict timbral oppositions in Chapter 3. While I consider my work to be informed by the large body of work on quantitative measurement of timbre by McAdams and others, my analytical method is generally qualitative and comparative: my method

\textsuperscript{43} Lochhead, 258.
\textsuperscript{44} ibid., 258.
\textsuperscript{45} ibid., 271.
does not, therefore, rely on absolute measurements. Timbre, and the terms I use to describe it, is discussed in less precise terms than would be normative in a quantitative scientific study.

In Chapter 3, I analyze three pieces: Joel Puckett’s *It Perched For Vespers Nine* for large wind band, the second movement of Steven Stucky’s Second Concerto for Orchestra, and the third movement of my Symphony for wind ensemble. These pieces were chosen because of their multifaceted analytical potential, especially in timbral, harmonic, and motivic content. My analyses demonstrate how forms are generated from opposing timbres, an idea clearly articulated in the above-cited studies by Malloch, François, and Mirka. My formal analysis of Puckett’s work also involves timbral rhythm and acceleration, ideas that are articulated by Lochhead and Tsang. Building on the work of François, Mirka, Malloch, and Lochhead, sound sources play an important role in creating my generalized timbre categories. My work differs from the cited studies in that the sound sources I am focusing on are primarily winds, while François worked exclusively with percussion, Mirka with string instruments, Malloch with full orchestra, and Lochhead with chamber ensemble and electronics.

My work also differs in that the pieces in chapter three can also be convincingly approached through common methods of harmonic and motivic analysis. In the earlier research, François works with the largely indeterminate pitch world of percussion ensemble, Mirka with the “sonoristic” (Polish avant-garde sound mass compositions of the 1960’s) music of Penderecki, Lochhead with electronics and a score that is only only partially notated, and Malloch with the partially indeterminate music of Lutoslawski. Although I generally focus on timbre, harmony and motive are discussed when relevant.

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46 Mirka, 454.
The cited studies do not propose labels for different types of formal analysis based on timbre. The pieces I am analyzing illustrate two formal types based on timbral centricity and timbral progression, respectively.
CHAPTER 2: TOOLS FOR DISCUSSING TIMBRE

This chapter presents terminology needed to discuss timbre in chapter 3. Timbre itself is not easily defined; as the survey of literature in chapter 1 would suggest, a single definition of timbre is problematic. In fact, a narrow definition would be limiting to the goals of this study, which draws broad comparative associations between sounds. After a method of describing single timbres is arrived at, ways of discussing how more than one timbre interact are proposed. To accomplish this, the discussion progresses from single timbres to compound timbres, timbral prolongations, generalized timbre types, and finally counterpoint between generalized timbre types.

Because timbre is a multidimensional entity, it can most accurately be described in terms of several musical elements. Whereas a note may simply be described as a pitch, such as C4, describing a timbre is not so straightforward. If one hears a trumpet sound, multiple factors influence the experience of this sound, including, but not limited to, its pitch, volume, and attack. For the purposes of this study, these score-based attributes will be considered when describing the outline of a single timbre: pitch, dynamic, articulation, and sound source. These attributes make effective timbre descriptors due to their commonality in discourse among musicians. Although these elements outline one’s aural expectation, they do not describe the individual character of the sound. For example, two trumpet players may sound radically different playing the same pitch, dynamic, and articulation. The purpose of timbre descriptors in this study, while not accounting for performer-specific sound details, is to make predictions
from score-based information that are useful in discovering the timbral oppositions presented in chapter 3.

The inclusion of volume and pitch as descriptors may be unorthodox, as they are not often considered in definitions of timbre. Let us reference again the American Standards Association definition: "timbre is that attribute of auditory sensation in terms of which a listener can judge that two sounds similarly presented and having the same loudness and pitch are dissimilar."¹ Pitch and volume are, however, often considered to be influential on timbre. Stephen Malloch includes sharpness in his timbre descriptors, an attribute clearly dependent on pitch. Danuta Mirka states “a sound’s frequency and intensity-parameters which relate basically to pitch and loudness—exert an influence on the resulting timbre.”² Judith Lochhead’s definition is quite open-ended, and perhaps most useful in the context of this study: “the overall effect made by the quality of sound of a given sound source or a combination of sound sources.”³ The sound of an instrument playing in its upper register is a much different sound than its lower register. This hypothesis from experience can be readily supported by consulting spectrograms. The spectrograms below (Fig. 2.1) represent three trumpet samples from the University of Iowa (all the samples used in this chapter come from the University of Iowa).⁴

The spectrograms lend valuable visual insight into the differences in register that instruments produce and listeners hear. To read the diagrams, note that frequency of

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the sound’s various partials is measured along the x-axis (Hz), and intensity is measured along the y-axis (dB). The relative intensity of the overtones is more revealing than the specific values. The lowest sound, A3, is richer in perceptible overtones than A4, and much richer than A5. Compared with the A5 spectrogram, the A3 and A4 spectrograms contain considerably more frequencies of greater intensity than the fundamental. Due to these differences, pitch is sometimes a valuable parameter to consider when analyzing timbre.

Figure 2.1: Spectrograms of Trumpet Notes A3, A4, and A5.
Articulation has long been cited as playing an important role in allowing listeners to differentiate between sound sources. Articulation is related to attack time, which was one of the three acoustic dimensions mentioned in the 1999 McAdams study,⁵ and is also included in the later “Timbre Toolbox.”⁶ The expected listener's experience of an instrumental attack is usually discernable in a musical score, as reflected by the notated articulation. For example, an accented or staccato note is going to have a faster and more abrupt attack than a note that is slurred to, played legato, or played with gradual crescendo. Sound source also plays a factor, as the attack of certain instruments is

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faster than others. Visual evidence for this can be provided using Fast-Fourier Transform charts (FFT). The FFT measures the intensity of a sound’s component frequencies over time, making it ideal for visualizing attack time and the evolution of a sound. To read the diagrams, note that frequency is measured along the y-axis, and time along the x-axis. The intensity of the frequencies is depicted by the relative darkness of the horizontal lines. The FFT’s above (Figure 2.2) demonstrate the difference between the slow attack of a clarinet and the immediate attack of a struck crotale over the duration of about one second. One can see that the component frequencies of the crotale are immediately of high intensity, whereas the component frequencies of the clarinet gradually increase in intensity.

Sound source might be the most concrete way to describe a timbre. Simply put, what instrument is playing? The formal analyses of Mirka, François, Lochhead, and Malloch all rely on generalizing timbre categories based on sound sources.7 We can see visual evidence for the differences in sound by once again consulting spectrograms. The following spectrograms (Figure 2.3) measure similar sound sources, horn and alto saxophone, both playing A4 at a fortissimo dynamic. Their spectrograms show that the intensity of the fundamental is quite high, and decreases considerably in the upper harmonics. This confirms the similarity between the tones of the horn and alto saxophone, one of the reasons for which they are so often doubled in many concert band scorings. The spectrograms in Figure 2.4 compare two disparate sounds, the oboe and the clarinet, both playing A4 at fortissimo. One can see that the intensities of the clarinet overtones decrease drastically with increasing frequency, while the

intensities of the oboe overtones increase for the first three harmonic partials before decreasing.

Figure 2.3: Spectrograms of Horn and Alto Saxophone A4 (demonstrating similar timbres).

Figure 2.4: Spectrograms of Clarinet and Oboe (demonstrating disparate timbres).
To restate, timbre is described in this study in terms of musical elements that affect the perception of timbre: pitch, dynamic, articulation, and sound source. For example, a sound may be heard as a “trumpet playing a C5 at pianissimo with legato attack,” or a “horn playing an E4 at fortissimo with an heavily accented attack.” These score-based descriptors are fairly concrete and will provide an objective way of comparing timbre in the contexts presented later in this paper, as well as a basis from which to extrapolate another quality that is not score-based: brightness (boldface terms are defined in Appendix A).

Brightness is a term that has both a narrow scientific definition and a less specific use in musical conversation. For example, it may be said that “the saxophone player has a bright tone,” or that “the trumpet player has a dark tone.” Although brightness is discussed in this study as extrapolated from information in the score, a narrow definition and measured data lends valuable insight in understanding the term. Scientifically, the spectral centroid, or “center of gravity of the spectrum, [which is] often referred to as a measure of perceived brightness,” is observable from spectrograms.\(^8\) Brightness, and the lack thereof (darkness), make good timbre descriptors, and are the only non-directly score-based properties of single sounds that will be used in this paper. If we compare the above examples in Figure 2.4, we can see that the sound of the oboe is much brighter than the clarinet. The oboe sound’s first three overtones are higher than its fundamental, whereas in the clarinet sound, the fundamental is most intense.

Assessments of brightness in this study also take into account pitch, dynamic, and

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attack. Brightness generally varies directly with increasing pitch and dynamic. A harder, faster attack usually correlates with a brighter sound.

Brightness and darkness are also be useful in describing compound timbres, or sounds consisting of at least two inputs from one descriptor of timbre. For instance, a sound consisting of two sound sources would constitute a compound timbre, as well as one sound source playing two pitches (such as a multiphonic or double-stop) or two articulations (violin playing both pizzicato and arco). Describing a compound timbre as dark or bright based on its constituent elements is relevant in this study for the purpose of comparison, or when one compound timbre can be described as brighter than another.

In addition to composite brightness, dynamic, and articulation, compound timbres can be assessed in terms of their width and roughness. I borrow the terms from Malloch, but will define them in terms of score-based attributes, and not measured quantities.\(^9\) I will use width to describe how wide or focused a sound is, assessed based on the number of sounds occurring vertically in a given moment in time (sound density) and how many instruments are involved. A sound becomes wider with increasing instrumentation. Also, lower pitched timbres are more likely to have width, whereas higher pitched timbres are more likely to sound focused. Contributing to the perception of width is the number of sounds occurring within a specific range (registral density), which is dependent on the closeness or openness of the voicing; a chord with closed voicing can be considered to have more width than a sound with open voicing. Roughness will be simply measured by the dissonance level of the chord in question.

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\(^9\) Malloch, 55.
For example, an (014) trichord would most likely sound more dissonant, and therefore rougher, than a major triad (037).

These timbral descriptors can show the comparative difference between the following two sounds, taken from the first movement of my Symphony (Figure 2.5). The sound in m. 100 could be described as dark, wide, consonant, loud, and full. The sonority in m. 131 could be described as bright, focused, dissonant, and also loud and full. In comparing the timbres, we could say that the timbre in m. 131 is brighter, more focused, and rougher than the timbre in m. 100. The low brass sonority is considerably darker than that of the high woodwinds, trumpet, and percussion instruments. The low center of gravity of the sound in m. 100 is going to be perceived as wider than the high,

Figure 2.5: John Hennecken, Symphony, mov. 1 m. 100,131 (demonstrating compound timbres). Analytical reductions.
piercing tone of the sound in m. 131, despite their absolute ranges not being considerably different (about three octaves in both sounds). Finally, the (01478) in m. 131 is clearly more dissonant, and therefore rougher, than the open fifth power chord in m. 100.

Building on the descriptive tools for compound timbres, ways of assessing large sections characterized by consistent timbre must be proposed. According to François, “timbre is generally not constituted by a single occurrence of a given event, but takes its substance from being inscribed in the context of a succession of sounds.”¹⁰ We can refer to sections in which at least one prominent descriptor of timbre is held constant as timbral prolongations. The description of timbral prolongations potentially engages all elements that influence our perception of timbre. The following excerpt (Figure 2.6), from Thomas Adès’s orchestral piece, Polaris, provides an example of two timbral prolongations. The first is found in the music of the top three staves. Timbre descriptors held constant through this section include sound source (piano and harps with assistance from the tubular bells) and accented articulations. The section also has a high “attack density,” which can be defined as the number of attacks in a given period of time.¹¹ Although not as relevant to the above discussion of single sounds, attack density is useful here in describing timbral prolongations. The second timbre prolongation is on the fourth stave, characterized by the sound source (trumpet), low attack density, and as the line goes on past the excerpt, slow attack time resulting from smooth slurred articulation.

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¹⁰ François, 55.
¹¹ ibid., 58.
The following excerpt, from the second movement of my Symphony, also demonstrates two timbral prolongations. The first is found in the music of the top three staves. One sound source that is held constant is the piano, which features high attack density, fast attack times, and a large pitch range created by an angular line. Other sound sources contributing to the timbral prolongation include harp, chimes, and

Figure 2.6: Thomas Adès, *Polaris*, mm. 29–34 (demonstrating timbral prolongations).
Analytical reduction.

Figure 2.7: John Hennecken, Symphony, mov. 2 mm. 1–6 (demonstrating timbral prolongations). Analytical reduction.
glockenspiel. Due to their percussive attack times, they augment the sound of the piano and, therefore, are part of the timbral prolongation. The second timbral prolongation is on the fourth line, a melody shared by the trumpet and saxophone. Along with the sound sources, this timbral prolongation is characterized by the slurred articulations, which give the sense of slow attack time. The line also has a limited range, focusing on motivic neighbor-note motion between A4 and B-flat 4.

In order for timbre to be a tool for formal analysis, it must be generalizable beyond single moments. Individual timbres, compound timbres, or timbral prolongations which maintain enough parameters can be categorized into labeled, general timbres, such as Timbre A and Timbre B. This type of associative process was key to the formal plans based on timbre in the studies by Malloch, Mirka, Lochhead, and François.

In the following excerpt from Thomas Adès’s *Polaris* (Figure 2.8), general timbres can be identified when compared to the Adès excerpt in Figure 2.6 on page 23. The timbral prolongation which was previously created by the piano, harps, and tubular bells, has now moved into new sources found in the top two lines, including piccolo, second violin, crotales, and glockenspiel. Parameters remaining the same are fast attack times and high attack density. This general timbre could be labeled Timbre A. The second timbral prolongation, which was previously sounded in the trumpets, is now heard contrapuntally in the trumpets, horns, trombones, tuba, and string bass. Parameters remaining the same are similar sound sources (brass), low attack density, and slow attack times resulting from smooth, slurred articulation. This general timbre
Analytical reduction.

could be labeled Timbre B. By categorizing Timbres A and B, now there would be possibility for the discussion of how they interact in a form.

General Timbres can develop several times over the course of a piece. This can be heard in several excerpts from my Symphony. The following excerpt, from the very beginning of the piece, features a timbral prolongation characterized by low attack density, soft dynamics, high dissonance level, and stillness of tone (the string bass harmonic and clarinet multi-phonic would be expected to have little vibrato, while the alto flute is specifically marked no. vib.).

Figure 2.8: Thomas Adès, *Polaris*, mm. 130–135 (demonstrating a general timbre).
The next excerpt is the first recurrence of the timbral prolongation. At this point we can generalize the timbral prolongation, labeling it Timbre A. Parameters holding constant include several sound sources, high dissonance level, and stillness of tone (the repetitive figuration in the alto flute, clarinets, and alto sax creates a sense of stasis). The first clarinet, once again, plays F5, before yielding to the solo trumpet. The
entrance of the trumpet can be heard as one brass sound transforming into another: a development of the trombone entrance in the first occurrence of Timbre A. Other developments of Timbre A include increased attack density and added sound sources. The next development of Timbre A reverts back to a version more like the original, with high dissonance level, low attack density, and stillness of tone. The sound sources are the same, including the first clarinet on F5, and piano on E-flat 4. The string bass has changed in that it is no longer playing a harmonic.

Figure 2.9c: John Hennecken, Symphony, mov. 2 mm. 53–54. Analytical reduction.

Timbre A develops further in movement 1, mm. 104-107 (Figure 2.9d). The solo clarinet entrance is this time accompanied by the full complement of clarinets, filling in dissonant harmony underneath the F5. Marked no vibrato, the entrance maintains a stillness of tone similar to an organ. The string bass enters once again on D3, this time specifically marked no vibrato. The trombone entrance, reminiscent of the opening (Figure 2.9a), leads into the trumpet entrance in m. 105, once again articulating the
brass timbre transformation. The piano is absent in this variation, however the chimes take its place, sounding E-flat 4 in m. 104.

Figure 2.9d: John Hennecken, Symphony, mov. 2 mm.104–107. Analytical reduction.

The final development of Timbre A occurs in the third movement, at the beginning of the symphony’s Largo coda (Figure 2.9e). The general timbre is signaled by the solo clarinet and introductory character; however, the timbre is altered drastically from there. The sound is revitalized by the water glass, upper register flutes, and

Figure 2.9e: John Hennecken, Symphony, mov.3 mm. 218–220. Analytical reduction.
consonant tertian harmony. The consonant harmony renders the sound less rough than its previous iterations.

Two or more superimposed timbral prolongations create **timbral counterpoint**. The texture of the music can be described in terms of this counterpoint. Further, the counterpoint between general timbres can be described based on the changing parameters. For example, the relationship between Timbre A and Timbre B can change over the course of a piece. Development in the counterpoint between general timbres can lead to variations in the stratification of the texture. This concept is discussed in the aforementioned study by Tsang. In his writing on “audio stream salience,” the author states that

> timbral differentiation may be the primary means for choreographing foreground/background effect... listeners are most likely to link sonic events that share similar tone colors; conversely, listeners tend to segregate sonic events whose tone colors are quite different.  

Although Tsang is discussing specifically how tone colors assist the listener in perception of texture stratification, I extend his concept to include all of the timbre descriptors I have discussed.

The following excerpt, from Thomas Adès’s *Polaris*, demonstrates the development between the counterpoint of general timbres and requires a comparison of Figure 2.8 and 2.10. In Figure 2.8, Timbre A was defined as having fast attack times and high attack density. Timbre B was characterized by slow attack times, low attack density, and predominantly brass sound sources. In Figure 2.10, Timbre A is

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13 ibid., 35.
discernable by its high attack density. It has developed through lowering of register and slowing of attack times, the latter due to slurred articulation. Timbre B is discernable by its slow attack times, low attack density, and brass sound sources (despite losing trumpet and tuba). The contrapuntal relationship between Timbres A and B has clearly changed between the two excerpts. In the excerpt in Figure 2.8, both general timbres were clearly audible due to their unique parameters. Timbre A’s high register, fast attack times, and high attack density differentiate it from Timbre B’s low register (emphasized by tuba), slow attack times, and low attack density. In Figure 2.10, the parameters most responsible for differentiating Timbres A and B are attack density (A is higher) and sound source (strings and brass, respectively). Both Timbre A and Timbre B have slow attack times, and are in relatively low registers. Therefore, in this excerpt, Timbre A sounds like it is a rhythmically active accompaniment to a principal voice, Timbre B.

Figure 2.10: Thomas Adès, *Polaris*, mm. 217–220. Analytical reduction.
Another example of contrapuntal development between general timbres can be found in the second movement of my Symphony, as evidenced by a comparison of Figure 2.7 and 2.11. In Figure 2.7, Timbre A was defined as having fast attack times, high attack density, large range due to an angular line, and the piano as its main sound source. Timbre B was defined as having slow attack times, limited range focused on the neighbor note motion between A and B-flat, and trumpet and alto saxophone sound sources. In Figure 2.11, Timbre A is found in the lower two staves, and is once again discernable by the large range, fast attack times, and high attack density. The sound sources have changed, with the harp taking the place of the piano. Its sound is augmented by the bass drum. The sense of continued high attack density is also supported by the marimba. Additionally, the marimba provides harmonic support for Timbre B, now sounded by the clarinets. Timbre B is discernable by its slow attack
times, limited melodic range and motivic neighboring motions between A and B-flat, followed by C and D. The neighbor motives are also echoed in the supporting clarinet lines.

In comparing the developing counterpoint between the general timbres across the two examples, one can see that, in Figure 2.7, Timbre A will be prominent, due its higher register and brighter overall sound projected by the piano and glockenspiel. Timbre B will sound equal or subordinate, as its slower attack times and lower attack density will render it less salient. In Figure 2.11, Timbre A will sound less salient, and probably accompanimental, due to the soft dynamic of the harp (its relatively loud dynamic markings are written to compensate for its inherent softer dynamic), low register, and the less bright sound of the bass drum. Timbre B will sound like the primary line due to its higher register. Timbre B is also wider than Timbre A, due to its greater numbers of instruments, giving it a more foregrounded sound in this case. Depending on dynamics and register, a wide timbre may be subordinate to a more focused one.
CHAPTER 3: FORMAL ANALYSES BASED ON TIMBRAL OPPOSITIONS

This chapter explores possibilities for formal analysis based on timbral oppositions. Three works, or movements of works, are analyzed: including Joel Puckett’s *It Perched For Vesper’s Nine*, the second movement of Steven Stucky’s Second Concerto For Orchestra, and the third movement of my Symphony. In each analysis, timbral oppositions are described in terms most appropriate to the music. From these analyses, complementary formal types emerge based on the concepts of timbral centricity and timbral progression. In a form demonstrative of timbral centricity, one general timbre, (as defined in chapter 2) called a central timbre, is heard as both in between and separate from the oppositional relationship. In a form demonstrative of timbral progression, the relationship between general timbres gradually changes, or transforms entirely, over time.

Eight years ago, a dying man’s mysterious last words inspired Joel Puckett’s *It Perched for Vespers Nine*, for large wind band. The grandfather of the composer’s wife, whom Puckett describes as “a man who always chose the right words,” spoke the following utterance:

In mist or cloud…
…on mast or shroud…
… It perched for Vespers nine…
…While all the night…
… through smoke fog white.
Glimmered the white moon-shine.¹

Those words were discovered to be part of a poem by Samuel T. Coleridge, entitled “The Rime of the Ancient Mariner.” Puckett, who has established himself as an eminent young composer, especially for wind band, writes that Vespers “on a surface level engages the imagery of the verse itself.”\(^\text{2}\) Perhaps it might be expected that analysis of the music will yield multi-faceted results as nuanced as the inspirational verse? The following discussion is an investigation into this question.

This analysis of Vespers focuses on its timbral design; however, it is useful to first introduce prior analytical work which has been done on the piece regarding its motivic and harmonic content, Matthew O. Smith’s “A Conductor’s Analysis of Joel Puckett’s It Perched For Vespers Nine.”\(^\text{3}\) Smith’s analysis points out that the main theme gradually grows from a small cell into its full form. He also demonstrates that the harmonic content of the piece is generated by the intervallic content of the theme, and identifies pedal points. His formal outline works concurrently with my own.\(^\text{4}\) He demonstrates that the piece is in an ABA form, primarily through analysis of motivic and thematic material.

The form of Vespers can also be heard as generated from timbral oppositions, and as demonstrative of timbral centricity. Presented at the beginning of the piece, these oppositional general timbres are characterized primarily by consistency of sound source. I will refer to these timbral oppositions as Timbre A and Timbre B. They are heard in counterpoint both with each other, as well as with what I will refer to as a central timbre. The central timbre stands alone, not taking part in the binary timbral

\(^2\) Puckett, front matter.
\(^4\) ibid., 65.
Table 3.1: Opposition of General Timbres in Joel Puckett’s *It Perched For Vespers Nine*

<table>
<thead>
<tr>
<th>General Timbre</th>
<th>A: Wood</th>
<th>Central Timbre</th>
<th>B: Metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
<td>1. Clarinet</td>
<td>Oboe</td>
<td>1. Horn</td>
</tr>
<tr>
<td></td>
<td>2. Flute</td>
<td></td>
<td>2. Muted Brass</td>
</tr>
</tbody>
</table>

opposition scheme. Timbre A, Timbre B, and the central timbre are designated in Table 3.1. Timbre A is projected by woodwind sounds, particularly the clarinet and the flute. Timbre B is projected by metallic, brass sounds, particularly the horns and muted brass.

The central timbre of the piece is the oboe, which is often heard as soloistic. According to Smith, the composer chose the oboe “due to its strident sound and its ability to produce a weighted sound as it intensifies through sustained notes.”<sup>5</sup> Puckett himself describes the oboe in evocative terms: “Its sounds old, it sounds wise. [The Oboe is] full of life experience… with the salty material of the brief motive.”<sup>6</sup> The oboe may have also been the logical choice for central timbre based on its centrality within the spectrum of available wind band timbres. While being a woodwind instrument, the oboe’s sound is similar to a trumpet in brightness (recall the spectrograms in Chapter 2). Only the sounds relevant to the form of the piece are listed in Table 3.1.

Saxophones play a connective role between Timbres A and B. They are almost always heard blending with other sounds, and work well supporting both oppositional timbres. Many other sounds contribute to pedals and percussive punctuations; however, the instrumental makeup of these events does not contribute to defining form in this analysis. Figure 3.1 demonstrates the interaction of the central timbre and oppositional Timbres A and B.

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<sup>5</sup> Smith, 63.

<sup>6</sup> Ibid., 63.
Timbre generates form in *Vespers* in a manner that is somewhat reminiscent of the ways harmony and themes generate the classical sonata form. The work includes an exposition, development, and recapitulation (ABA in Smith’s analysis) generated by

Table 3.2: Overall Form of Joel Puckett’s *It Perched For Vespers Nine*

<table>
<thead>
<tr>
<th>Section</th>
<th>Time</th>
<th>Form Defining Timbres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposition (mm. 1–34)</td>
<td>Beginning</td>
<td>Primary Timbre: Oboe, supported by Establishment of Timbre A and B</td>
</tr>
<tr>
<td>Development Part 1 (mm. 35–80)</td>
<td>2:39</td>
<td>Timbre A and B deconstructed into components, sounded in juxtaposition with changes in timbral rhythm</td>
</tr>
<tr>
<td>Development Part 2 (mm. 80–97)</td>
<td>6:22</td>
<td>Timbral Stretto</td>
</tr>
<tr>
<td>Standing on the Dominant</td>
<td>7:58</td>
<td>Flutes</td>
</tr>
<tr>
<td>Recapitulation (mm. 106–end)</td>
<td>8:30</td>
<td>Primary Timbre: Oboe, supported by Timbre A and B</td>
</tr>
</tbody>
</table>
use of timbre. The oboe, as central timbre, is analogous to a primary theme, as it is almost ever-present in the texture of the exposition and recapitulation. Timbre A and Timbre B support the primary timbre in the exposition in a dichotomous manner, similar to how tonic and dominant areas support a mono-thematic classical sonata form.

Admittedly, the analogy is not perfect, as Timbre A and Timbre B do not provide tension and release in the manner of tonic and dominant harmony, nor do they appear in self contained theme group areas. Table 3.2 charts the large-scale form of the piece in terms of the classical sonata, and Table 3.3 charts the exposition. The timings listed in the chart are from a recording by the United States President’s Own Marine Band, conducted by Jason Fettig.  

Table 3.3: Form of Exposition (mm. 1–34) of Joel Puckett’s *It Perched For Vespers Nine*

<table>
<thead>
<tr>
<th>Measures</th>
<th>Time</th>
<th>Timbre</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm. 1–15</td>
<td>Beginning</td>
<td>Oboe + Timbre A</td>
</tr>
<tr>
<td>mm. 16–18</td>
<td>1:04</td>
<td>Oboe + Timbre A</td>
</tr>
<tr>
<td>mm. 19–23</td>
<td>1:22</td>
<td>Oboe + Timbre B</td>
</tr>
<tr>
<td>mm. 24–27</td>
<td>1:53</td>
<td>Oboe + Timbre A</td>
</tr>
<tr>
<td>mm. 28–29</td>
<td>2:06</td>
<td>Oboe + Timbre B</td>
</tr>
<tr>
<td>mm. 29–31</td>
<td>2:10</td>
<td>Oboe + Pedal</td>
</tr>
<tr>
<td>mm. 32–34</td>
<td>2:24</td>
<td>Oboe + Timbre A + Timbre B</td>
</tr>
</tbody>
</table>

The development (mm. 35–106) begins by fleshing out the opposing general timbres in mm. 35–47 (Table 3.4). The opposing timbres are broken down into

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Table 3.4: Form of Beginning of Development (mm. 35–47) of Joel Puckett's *It Perched For Vespers Nine*

<table>
<thead>
<tr>
<th>Measures</th>
<th>Time</th>
<th>Timbre</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm. 35–37</td>
<td>2:39</td>
<td>Timbre A1</td>
</tr>
<tr>
<td>mm. 38–39</td>
<td>2:52</td>
<td>Timbre A2</td>
</tr>
<tr>
<td>mm. 40–41</td>
<td>3:00</td>
<td>Timbre A1</td>
</tr>
<tr>
<td>mm. 42–44</td>
<td>3:12</td>
<td>Timbre A2</td>
</tr>
<tr>
<td>mm. 45–47</td>
<td>3:27</td>
<td>Timbre B2,B1,B</td>
</tr>
</tbody>
</table>

components that function as internal timbral oppositions. The internal timbral oppositions mirror the timbral oppositions of the large form. Both opposing timbres can be broken into two components, the first of which is darker than the second. Timbre A1 is characterized by the sound of the clarinets. When heard as a part of the complete Timbre A, they blended with the flutes and saxophones in support of the oboe; however, in this case, the wooden clarinet sound is emphasized by the bass clarinet, as well as its unique melodic material. Timbre A2 is brighter than Timbre A1, and is primarily characterized by the flutes, with support from the piano. Their sound is also emphasized by their unique melodic material, which eventually grows into a flurry of chromatic descents (mm. 57-85) which Smith labels as a “screen.”

In *Vespers*, a screen is a timbral prolongation of repeating motivic ideas that coexist with other materials in a way that creates a multi-layered musical atmosphere. An alternation of Timbre A1 and Timbre A2 is shown in the following excerpt:

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8 Smith, 63.
Figure 3.2: Joel Puckett, It Perched For Vespers Nine, mm. 40–42. Analytical reduction.

Timbre B1 is primarily sounded by the horns, and Timbre B2 is characterized by the brighter sound of the muted trumpets and trombones. The following excerpt, mm. 45-47 features a juxtaposition of Timbre B1 and Timbre B2, followed by the complete sound of Timbre B:

Figure 3.3: Joel Puckett, It Perched For Vespers Nine, mm. 45–47. Analytical reduction.
Much like in Lochhead’s analytical section of “transformation and intensification,” the development features a faster alternation of timbres, reaching its peak in mm. 81-98. This faster alternation can be heard as analogous to accelerating harmonic rhythm. This section features the most complex counterpoint in the piece. Imitative polyphony is often the hallmark of motivic and thematic developmental procedure; however, Puckett’s imitative polyphony is not dependent on pitch-based compositional virtuosity. It depends, instead, on timbre and range allowing imitations of the theme to emerge from a dense texture. The low register of the flute allows the oboes, supported by the alto saxophones, to ascend to the peak of the sound in mm. 81-88. The section comes to a dramatic climax in mm. 89-93 (Figure 3.4), as the imitative counterpoint ascends up the dark side of Timbre A, (low clarinets) through the central timbre (oboes supported by alto saxophones) through the dark side of Timbre B1 (horn).

Figure 3.4: Joel Puckett, It Perched For Vespers Nine, mm. 89-92. Analytical reduction.

By measure 89, the flute screen has been subsumed by the imitative texture. The flutes are left almost alone to play the theme in stretto at m.98 (Figure 3.5). This section can be heard as a timbral “standing on the dominant.” Although the flute screen does not propel the music toward a dominant-tonic resolution, its ever-presence is similar to a harmonic pedal beginning with its entrance in m. 57, and is now is left as the most prominent timbre in the transition to the recapitulation.

![Figure 3.5: Joel Puckett, It Perched For Vespers Nine, mm. 98–105. Analytical reduction.](image)

Table 3.5: Form of Recapitulation (mm. 106–end) of Joel Puckett’s *It Perched For Vespers Nine*

<table>
<thead>
<tr>
<th>Measures</th>
<th>Time</th>
<th>Timbre</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm. 106–109</td>
<td>8:30</td>
<td>Oboe + Timbre A</td>
</tr>
<tr>
<td>mm. 109–112</td>
<td>8:42</td>
<td>Oboe + Timbre B</td>
</tr>
<tr>
<td>mm. 112–114</td>
<td>8:52</td>
<td>Oboe + Timbre A</td>
</tr>
<tr>
<td>mm. 114–117</td>
<td>9:00</td>
<td>Oboe + Timbre B</td>
</tr>
<tr>
<td>mm. 117–128</td>
<td>9:10</td>
<td>Oboe + Timbre A</td>
</tr>
<tr>
<td>mm. 129–130</td>
<td>9:45</td>
<td>Oboe + Timbre A2</td>
</tr>
<tr>
<td>mm. 131–end</td>
<td>9:55</td>
<td>Oboe</td>
</tr>
</tbody>
</table>
At measure 106, the recapitulation begins as the oboe resumes its soloistic “thematic” role from the beginning of the piece. Timbres A and B once again play supporting roles. The recapitulation of the central timbre supported by the opposing timbres provides evidence for a formal scheme based on timbral centricity. The form of the recapitulation is charted above in Table 3.5.

From the next analysis, a formal archetype emerges based on timbral progression. The piece under analysis is the second movement of Steven Stucky’s Second Concerto for Orchestra. Stucky, one of today’s leading composers, won the Pulitzer Prize for the Second Concerto in 2005. The piece is in three movements, including an Overture, Variations, and Finale. The Variations movement contains what could possibly be called a theme (it is not labeled as such) and six variations. Each variation can be heard as a three-part form with an A section, B section, and transition. The A section generally features scalar melodic material, while the B section features motivic material based on thirds. Although the piece certainly invites a thorough motivic and harmonic analysis, the focus here will be on timbre.

If timbre is considered as an organizing factor, the same three-part form (A–B–trans.) holds in each variation. The transition material varies in its content- it can either be an A’ or B’ section within each variation. As in the Puckett piece, timbre oppositions define the formal sections; however, the general timbres are not based on sound sources, but on the relative brightness and registers of the instruments involved. Within each variation, A is always darker than B, however the relationship does not extend outside of the variations. For example, the A section of Variation III is brighter than B section of Variation I. I emphasize that brightness is always assessed as a comparative
description between sections, and not as a scientific measure based on data. The following excerpts, from the A (Figure 3.6) and B (Figure 3.7) sections of the unnamed theme, illustrate the timbral oppositions. The scalar motivic material of the A section is a dark tapestry of linear counterpoint rising from the lowest registers of the orchestra. At measure 9, the B section brightens up with the continuation of the flutes (they enter

Figure 3.6: Steven Stucky, Second Concerto For Orchestra, mov. 2 mm. 1–2.  
Analytical reduction.

Figure 3.7: Steven Stucky, Second Concerto For Orchestra, mov. 2 mm. 9–14.  
Analytical reduction.
in measure 7) before the even brighter solo oboe enters in measure 11 with motivic material based on thirds. The transition to Variation I begins in m. 26, defined by the change in articulation from slurs to accents, with the accented unison oboe on A5. The transition can be considered as B’ due to the continued bright timbre of the oboe and other high register woodwinds. The transition is the dramatic peak of the theme, as it focuses on the highest note played in the piece by this point (A5); the entrance of the tam also increases the overall intensity of the transition.

Table 3.6 illustrates the form of the entire piece, based on the internal timbral oppositions of each variation. The chart accounts for register (Reg.), and Attack (Atk), including L (legato or slow attack times) and A (accented or fast attack times). The timings are taken from a recording by the Singapore Symphony Orchestra, conducted by Lan Shui. The internal timbral oppositions for each variation are accounted for, as well as deeper level background timbral oppositions between pairs of variations, as discussed below.

Variation I is an example of ABA’. The entrance of the muted trumpets playing motivic material based on thirds in m. 46 clearly brightens the sound, justifying the B label. Unlike the Theme, where the bright sound of the oboe continued through transition, in Variation I, the muted trumpets yield to the darker sounds of Variation IA, justifying the A’ label. The sound becomes darkest as it journeys into the low register bass clarinet solo in m. 60.

The ABA’ (dark-bright-dark) form of Variation I makes it sound formally closed, whereas the ABB’ (dark-bright-bright) form of the Theme makes it sound formally open.

---

10 Steven Stucky, Second Concerto for Orchestra, Conducted by Lan Shui and Singapore Symphony Orchestra, BIS, 2010, CD.
Table 3.6: Form Chart of Steven Stucky’s Second Concerto for Orchestra, mov 2

<table>
<thead>
<tr>
<th>Var</th>
<th>Timbre</th>
<th>mm.</th>
<th>Time</th>
<th>Sound Sources</th>
<th>Reg.</th>
<th>Atk</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>X</td>
<td>A</td>
<td>1–8</td>
<td>0:00 clarinets, bass clarinet, bassoon, harp, piano</td>
<td>low, (asc)</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>9–26</td>
<td>0:48</td>
<td>oboe, flutes</td>
<td>mid-high</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>B'</td>
<td>26–32</td>
<td>2:15</td>
<td>+ tam</td>
<td>+</td>
<td>A</td>
</tr>
<tr>
<td>I</td>
<td>Y</td>
<td>A</td>
<td>33–45</td>
<td>2:42 flutes, English horn, clarinet, bassoon</td>
<td>mid (asc)</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>46–51</td>
<td>3:50</td>
<td>muted trumpets</td>
<td>mid (asc)</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>A'</td>
<td>52–62</td>
<td>4:18</td>
<td>flutes, oboes, English horn, clarinets, bassoon, bass clarinet solo</td>
<td>+ (desc) to low</td>
<td>L</td>
</tr>
<tr>
<td>II</td>
<td>X</td>
<td>A</td>
<td>63–75</td>
<td>5:22 bassoons, bass clarinet, trombones, timpani</td>
<td>low (asc)</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>76–85</td>
<td>5:57</td>
<td>horns English horn, clarinets, bassoons, mar.</td>
<td>mid (asc)</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B'</td>
<td>86–92</td>
<td>6:22</td>
<td>+ contrabassoon, piccolo, flutes, string bass</td>
<td>low (asc*)</td>
<td>A</td>
</tr>
<tr>
<td>III</td>
<td>Y</td>
<td>A</td>
<td>93–104</td>
<td>6:36 piccolo, flutes, xylophone, wood blocks, string harmonics</td>
<td>high</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>105–117</td>
<td>6:52</td>
<td>muted trumpet, glockenspiel, high strings</td>
<td>high</td>
<td>A/L</td>
</tr>
<tr>
<td>IV</td>
<td>X</td>
<td>A'</td>
<td>118–128</td>
<td>7:12 marimba, xylophone</td>
<td>high</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>129–145</td>
<td>7:29</td>
<td>horns, trombones, trumpets</td>
<td>mid</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>146–151</td>
<td>8:34</td>
<td>muted trumpets, harp, flutes</td>
<td>mid-high</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>A'</td>
<td>152–167</td>
<td>8:56</td>
<td>trombones, horns</td>
<td>low-mid</td>
<td>A/L</td>
</tr>
<tr>
<td>V</td>
<td>Y</td>
<td>A</td>
<td>168–194</td>
<td>10:12 oboe, clarinet, flutes, strings</td>
<td>low-mid(asc)</td>
<td>A/L</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>195–204</td>
<td>10:48</td>
<td>oboe, bassoon, trumpets, glockenspiel, vibraphone, celeste, string harmonics</td>
<td>high</td>
<td>A/L</td>
</tr>
<tr>
<td></td>
<td>A'</td>
<td>205–218</td>
<td>11:02</td>
<td>piccolo, flutes, oboes, bassoon, strings, string bass solo</td>
<td>high, (desc)</td>
<td>A/L</td>
</tr>
<tr>
<td>VI</td>
<td>C</td>
<td>A</td>
<td>219–239</td>
<td>11:19 solo strings, harp, piano</td>
<td>low, (asc)</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>240–249</td>
<td>13:13</td>
<td>full strings</td>
<td>low-high</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>A'</td>
<td>250–262</td>
<td>14:00</td>
<td>horns, flutes, timp, string harmonics</td>
<td>low-mid</td>
<td>A/L</td>
</tr>
</tbody>
</table>
The open-endedness of the Theme, paired with the closure of Variation I, supports the hearing of a larger two-part form, which I will label XY: X is always darker than Y; however, the relationship is only applicable within single pairs of variations. If one compares the instrumentation between the respective X and Y sections, the Theme (X) is relatively darker and generally in a lower register than Variation I (Y).

Variations II and III also join to make a larger XY form. Variation II once again starts out in the dark depths of low brass and woodwinds, before the sound brightens up with the loud horn entrance in m. 76, along with mid-register woodwinds. The form of Variation II is left open as it transitions with gradually brightening ascending woodwind scales beginning at m. 86. The overall sound is registrally wide open (the chart includes an * under Reg because the register is not weighted high or low) as the high woodwinds play in counterpoint against repeated notes in the string bass. Variation III begins in the upper register, and is brighter than Variation II in its entirety: Variation III could be considered an exploration of degrees of brightness. The muted trumpet entrance and high strings in Variation IIIB (marked *Brilliante*) surpass the brightness of the piccolo and string harmonics in Variation IIIA. This dichotomy is also created by the tradeoff in the mallet percussion, between the dark marimba (IIIA) and bright xylophone (IIIB).

Variations IV and V once again create a large XY form, based on relative brightness, but this time the dramatic flow changes. Variation IV is ABA’, closing its form with an overall reduction of instrumental forces (horn solo) and volume. Variation IV is the first of two climaxes of the piece. This is evidenced by the loud dynamics and accented fanfare-like brass playing (marked maestoso at m. 156). Variation V, while standing in stark timbral opposition to Variation IV, is not a direct continuation. Instead,
Variation V serves as a developmental transition to Variation VI. The sectional motivic alternation between scalar lines and gestures based on thirds breaks down, as they are now superimposed in direct dialogue. The internal timbre oppositions, however, remain consistent. Variation VB, marked *Scintillante*, is perhaps the brightest section of the entire movement, evidenced by the high woodwinds, string harmonics, glockenspiel, vibraphone, and celeste. Variation VA’ features a gradual descent, leaving the dark, low register solo string bass to transition to Variation VI.

Variation VI has been labeled as Timbre C. Internally, it still maintains an ABA’ structure based on timbral oppositions; however, its overall sound is radically different from what has come so far in the movement. The timbral surprise is the entrance of the solo strings, beginning with the cello in m. 220 (Variation VIA). The solo strings play scalar lines that gradually rise in register and amass into a full sound in m. 240. The brighter Variation VIB begins at m. 240, emphasized by motivic thirds. The sound of the entire string section, playing at fortississimo and filling in a large registral space from top to bottom, creates the second climax of the movement. Up until this point, the winds and percussion dominated the movement, with the strings playing a mostly supporting role. The register had generally been limited to low, middle, or high, without filling the whole space. Variation VIA’ once again features darker instruments and lower register, and can be considered the coda of the movement. This coda has its own internal ABA’ form. The dark sound of the solo horns in m. 251 is brightened by the entrance of the higher register flutes in m. 254. The movement then concludes with the dark sound of low register timpani, harp, and piano, with harmonics in the cello and string bass.
The form outlined here can be considered timbrally progressive. The dramatic curve of the movement culminates with the introduction of a fresh sound source: the full string section. I will consider this formal event to be a timbral “breakthrough.” The idea of breakthrough as a formal concept originated with Paul Bekker, writing about the D-major chorale section in the finale of Mahler’s First Symphony.\(^{11}\) Adorno would write about the concept extensively, considering breakthrough, along with suspension and fulfillment as “essential genres in [Mahler’s] idea of form.”\(^{12}\) Mahler, while not using the word specifically, describes the essence of formal breakthrough in his own words: “My D chord had to sound as if it had fallen from heaven, as if it had come from another world.”\(^{13}\) John Sheinbaum writes about Mahler’s First: “what makes the piece work is not the achievement of some preordained goal, but paradoxically the sense that the moment feels simultaneously like a goal and like something brand new.”\(^{14}\) Sheinbaum points out that breakthrough moments in Mahler’s symphonies, although harmonically surprising, are signaled by timbre as well. The author describes a breakthrough chorale section in the second movement of the Fifth Symphony as “irreducibly timbral… The chorale is played by massed brass… in context their entrance is marked as a new event. Those instruments are withheld for 27 bars before the moment of breakthrough…”\(^{15}\)

The sixth variation in the second movement of Stucky’s Second Concerto for Orchestra clearly embodies the concept of breakthrough based on timbral progression.

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\(^{11}\) James Buhler, ""Breakthrough' as Critique of Form: The Finale of Mahler’s First Symphony," 19th Century Music 20, no. 2 Special Mahler Issue (Autumn, 1996): 129.


\(^{13}\) Buhler, 127.

\(^{14}\) Sheinbaum, 49.

\(^{15}\) ibid., 56.
Adorno’s other “essential genres,” suspension and fulfillment, are defined respectively as “a section in which musical processes are put on hold,” and “a moment or passage in which, through ‘patterns of freedom,’ expectations paradoxically are met.”\footnote{Sheinbaum, 43. Internal quote is author quoting Adorno.} In this chapter’s third and final analysis, a progressive timbral form will emerge that facilitates breakthrough, suspension, and fulfillment.

My Symphony (full score in Appendix B) is in three movements, including the fanfare-like “Ascensions,” a slow movement, entitled “Contemplations;” and the finale, “Variations.” The finale, which will be analyzed here, features an unnamed theme and five variations, the first four of which are in an (A–B–trans) form. The transition section functions in different ways, as discussed below. The motivic and harmonic materials of each A section are based on the tri-chords (015), (016), (048), and (026). The B sections exhibit a more diatonic harmonic world (often D minor).\footnote{Although beyond the scope of this paper, the harmony in the A and B sections is similar to that of the first and second movements, respectively.}

The internal conflict within variations is also generated by timbral oppositions. These timbral oppositions are based on sound source, and are designated in Figure 3.8. Therefore, sound source is the primary factor driving form in this discussion. The sound sources in conflict emerge from the fundamental instrumental dichotomy in the wind ensemble: woodwind and brass. Woodwind instruments are categorized within General Timbre A, while brass instruments are categorized within General Timbre B. The instruments are placed on a spectrum ranging from most wooden to most metallic. The far left of the diagram features the wooden percussion instruments, including marimba, xylophone, wood block, etc., while the far right of the diagram features metallic percussion, such as glockenspiel, crotales, and brake drum. The line
Figure 3.8: Timbre Oppositions in John Hennecken’s Symphony, mov. 3

<table>
<thead>
<tr>
<th>Wooden (A)</th>
<th>Mid</th>
<th>Metallic (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percussion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The oboe is in a box on its own due to its centrality within the wind instruments: it is a woodwind instrument with a bright timbre like the trumpet. Similar to its role in *Vespers*, the oboe has a unique function in my Symphony. The following musical examples are from the theme, and feature the oppositional relationship between Timbre A and Timbre B. Figure 3.9 projects Timbre A though the exclusive use of clarinets and wooden percussion. Figure 3.10 projects Timbre B through exclusive use of muted brass and metallic percussion.

Figure 3.9: John Hennecken, Symphony, mov 3 mm. 1–7. Analytical reduction.
The chart below (Table 3.7) lays out the form of the third movement. It includes the form-defining timbres of each section, as well as the overall type of attack (Atk).

The timbrally progressive form is charted in the Timbre column. With each variation, sound sources towards the middle of the spectrum are introduced, gradually mediating the oppositions. Timbral progression begins in Variation IB with the addition of bass trombone and tuba, creating a less purely metallic sound than that of strictly muted brass. The flutes play a prominent role in Variation IA, creating a less purely wooden sound on the way to Variation II. Variation IIA moves closer to a brass like sound due to the entrance of the alto saxophone solo, while Variation IIB once again becomes less metallic with the entrance of conical brass (euphonium and horn) and low saxophones.

The mediation of timbres concludes in Variation III: the A section features the full woodwinds, except for the oboe, in the upper register. Variation IIIIB features the full brass along with the alto saxophones, which play a connective role between the woodwind and brass sounds. Instead of A', the transition section of Variation III is
Table 3.7: Form Chart of John Hennecken's Symphony, mov. 3

<table>
<thead>
<tr>
<th>Var.</th>
<th>Timbre</th>
<th>mm.</th>
<th>Sound Sources</th>
<th>Atk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>clari...</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>A</td>
<td>1–13</td>
<td>clarinets, bass clarinet, marimba, wood blocks, whip</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>14–20</td>
<td>straight mute brass, brake drum, chimes, glock</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A’</td>
<td>21–27</td>
<td>clarinets, bass clarinet, marimba, wood blocks, whip</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>A</td>
<td>28–39</td>
<td>clarinets, bass clarinet, marimba, wood blocks, flutes, claves</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>40–47</td>
<td>straight mute brass, bass trombone, tuba, glock, chimes, crotales, brake drum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A’</td>
<td>48–58</td>
<td>flutes, clarinets, bass clarinet, wood blocks</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>A</td>
<td>59–75</td>
<td>alto flute, saxophone, clarinets, bass clarinet, claves, flutes</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>76–90</td>
<td>euphonium, horn, harmon mute trumpets, vibraphone, tenor/bari saxes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A’</td>
<td>91–96</td>
<td>flutes, saxes, clarinets, bassoons, wood blocks, claves</td>
<td>A</td>
</tr>
<tr>
<td>III</td>
<td>A</td>
<td>97–117</td>
<td>full woodwinds, xylophone, woodblocks, timpani, bass drum</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>118–127</td>
<td>saxes, bassoons, full brass, chimes, crotales, glock</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>AB</td>
<td>128–135</td>
<td>saxes, horns, timpani, bass drum</td>
<td>A/L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>136–140</td>
<td>+ flutes, trombones, tuba, toms, chimes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>141–147</td>
<td>+ piccolo, clarinets, trumpets, marimba</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>148–157</td>
<td>+ xylophone, tam (full ensemble)</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>C</td>
<td>158–175</td>
<td>string bass, piano, harp</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>176–191</td>
<td>+ oboes saxes, horns, bassoons</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>192–196</td>
<td>piano, horns, euphonium, tuba</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AB</td>
<td>197–209</td>
<td>full ensemble</td>
<td>A/L</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td>210–217</td>
<td>timpani, snare, toms, bass drum</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>218–223</td>
<td>flutes, clarinets, oboes, water glasses</td>
<td>A/L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>224–231</td>
<td>+ saxes, horns, euphonium, trombone, timpani, tam, chimes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>232–247</td>
<td>+ trumpets, oboe, piccolo</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>247–253</td>
<td>full ensemble</td>
<td></td>
</tr>
</tbody>
</table>
labeled AB, because it features the instruments from both general timbres. Variation IIIA serves as an accumulative development, starting in the center of the timbre spectrum with alto saxophones and horns, and gradually moving outward with the addition of instruments. The accumulative development builds to the dramatic climax of the third movement, and the entire symphony, when Timbre A is pitted against Timbre B in call and response superimposed with a Timpani solo (See Figure 3.11). The final hit in m. 156 rings for at least 15 seconds through m.157, allowing a period of repose before Variation IV.

![Figure 3.11: John Hennecken, Symphony, mov 3 mm. 153–156. Analytical reduction.](image)

After the timbral oppositions have come together in eventual cacophony through the first three variations, Variation IV brings formal timbral suspension. The string bass, piano, and harp lie outside of the oppositional framework and, to this point, have only been used sparingly. The oboes have also been silent. These instruments are featured in Variation IV, providing a sense of newness. This new sound world has been labeled C in the form chart (Table 3.6). In the excerpt below, the dark string bass solo is relieved by the entrance of the oboe duet.
The formal timbral suspension in Variation IV functions as a momentary break in the conflict between the timbral oppositions. Variation VAB reopens the dialogue, picking up where Variation III left off, with fanfare-like music, featuring loud dynamics, accented articulation, and high attack density across the ensemble. Variation VAB builds to a climax in m. 209, before a second timbral suspension, from instruments not in the central conflict, occurs. This suspension features a percussion break (label Timbre P in Table 3.6) between timpani, bass drum, snare drum, and toms, with support from the harp and snap pizzicato from the string bass.

The percussion break yields to silence in m. 217, setting up the second half of Variation V. The solo clarinet entrance in m. 218 is joined by the rest of the clarinets, flutes, and water glass (recall Figure 2.9e on page. 28). The harmony sounded is an F-sharp minor harmony which turns into a D MM 7th chord in m. 219. This final timbral area is supported by tertian (often MM 7th chords) and pan-diatonic harmony, ascending
to a seven-note chord that eventually ends the symphony. These harmonies support a new general timbre, labeled S, because it represents a synthesis of timbre: the label S has been used instead of AB because, in this variation, the timbres come together in a more homogenous sound. The homogenous sound is emphasized by entrances at soft dynamics in the winds, articulated by louder percussion hits. This allows for the wind sound to emerge from the percussion articulation, distorting the individual identities of the wind instruments. This articulation scheme is represented by the A/L designation in the form chart, but differs from previous A/L sections, which involved a heterogeneous mix of independent legato and articulate lines. The synthesis of the wind instruments is augmented by the ethereal, sustained timbre of the water glasses.

Is Timbre S, supported by harmony ranging from tertian to pan-diatonic, a timbral breakthrough? Has it, in Mahler’s words, “come from another world?” In the context of the third movement alone, breakthrough would be an understandable label; however, when analyzed under the scope of the entire symphony, Variation VS is, in fact, the fulfillment of breakthrough moments in the first and second movements. The first movement, while generally harmonically dissonant or timbrally rough, has a moment of breakthrough in mm. 100–105, when a low brass open fifth power chord (recall Figure 2.5 on page 21) ascends into a first inversion major chord sounded by the high woodwinds, supported by mid-range horn, trombone, and euphonium. The breakthrough moment is quickly thwarted by the return of “rougher” music in m. 106 through the end of the movement. The moment of breakthrough in the second movement comes in mm. 106–110. The timbre projected by the clarinets, alto flute, chimes, and string bass found in m. 104–105 (recall Figure 2.9d on page 28) transforms
at the peak of the trumpet solo in m. 107. The harmony shifts to a B-flat MM $7^{th}$ chord, creating a consonant, less rough timbre. These moments of breakthrough, based on major triad harmony and slow gestural ascent, are fulfilled in the final section of the third movement, which is essentially a gradual ascent from m. 224 to the end, cycling through MM $7^{th}$ chords. The moments of breakthrough and fulfillment are each introduced by the same general timbre, which functions as a kind of timbral trigger (recall Figures 2.9b, 2.9d, 2.9e on pages 26-28). This is demonstrated in Table 3.8 below.

Table 3.8: Moments of Breakthrough and Fulfillment in John Hennecken’s Symphony

<table>
<thead>
<tr>
<th>Movement</th>
<th>Preparation</th>
<th>Breakthrough/Fulfillment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>mm. 95–99</td>
<td>mm. 100–105</td>
</tr>
<tr>
<td>II</td>
<td>mm. 104–107</td>
<td>mm. 107–111</td>
</tr>
<tr>
<td>III</td>
<td>mm. 218–223</td>
<td>mm. 224–end</td>
</tr>
</tbody>
</table>
CHAPTER 4: CONCLUSION

I began this study by asserting that multiple analyses enrich our hearing of music. In order to show one way in which a multifaceted analytical approach is interesting, I start this chapter by discussing salient intersections of concurrent analyses. Then I propose possibilities for further work in timbral formal analysis.

In each of the three pieces analyzed in Chapter 3, the forms concurrently generated by harmony and timbre usually correlate; however, it is worth investigating what aspects of the music might be illuminated by formal sections that do not correlate. I call these situations **formal dissonances**. In Joel Puckett’s *It Perched For Vesper's Nine*, my timbral analysis works to corroborate the formal plan generated by Matthew O. Smith’s analysis; however, in both Stephen Stucky’s Second Concerto for Orchestra and my Symphony, the formal ideas of breakthrough, suspension, and fulfillment are articulated by transitions characterized by formal dissonance.²

In Chapter 3, I referred to Variation V of Stucky’s Second Concerto as transitional. This was because the harmonic/motivic material did not fit the established pattern found in previous variations. Whereas sections characterized by scalar material were juxtaposed with sections characterized by thirds in the unmarked Theme and Variations I–IV, Variation V featured superimposition of those materials. Although the motivic/harmonic formal pattern broke down, the timbral formal pattern remained intact,

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featuring a darker A section and brighter B section. This formal dissonance resolves in Variation VI, which, despite its breakthrough sound source (solo and full strings), once again features the harmonic/motive plan in alignment with the timbral plan.

In my Symphony, formal dissonance occurs in the suspension that is Variation IV. The harmonic pattern, characterized by the juxtaposition of dissonant trichordal materials with diatonic materials, is maintained, while the conflict of timbral oppositions is suspended. The conflict of timbral oppositions resumes in Variation V, continuing with the instrumental accumulation from Variation III. The formal fabric is torn yet again by the timbral suspension created by the percussion break; however, this event does create a formal dissonance. Not only are the timbral oppositions suspended, but harmony has also been suspended due to the indeterminately pitched percussion instruments. Because expectations for both timbre and harmony have been put on hold, the concurrent forms generated by the respective elements are in alignment.

I expect that there may be many other pieces of music that, while inviting traditional harmonic and motivic analysis, also lend themselves to the types of formal timbral analysis which I have applied to the works by Puckett, Stucky, and myself. Any piece that can support an oppositional timbre scheme may lead to interesting formal conclusions. In addition, it may be possible to base oppositional timbre schemes on more than two opposing timbres. There also may be potential for different methods of articulating timbral oppositions through the use of timbre descriptors that different from my own.

It may also be interesting to look to timbral explanations for orchestration choices. For example, in Chapter 3, I presented an analysis of Joel Puckett’s It
Perched For Vespers Nine based on timbral centricity: timbral oppositions revolve around the oboe’s sonority. The solitary oboe voice can be heard as the personal voice in the work, a musical protagonist, or a hero who, according to the composer, is “old and wise.”

Double reed instruments have been assigned this role of personal voice in the past, in works such as Beethoven’s Fifth Symphony and Shostakovich’s Eighth Symphony. In Beethoven’s Fifth, the solo oboe cries out in lament after the dramatic accumulative development, placing itself at the center of the conflict between oppositional themes. Given the numerous possibilities as to which instrument could take this role, perhaps the oboe was the logical choice, given its aforementioned timbral quality as a woodwind instrument with a bright trumpet-like sound. The oboe occupies a space that mediates woodwind and brass. This logic can also be heard in the wandering English horn solo of Shostakovich’s Eighth, placed in the analogous formal position.

Just as the musical content at the beginning of a piece of music organically generates its form, so does the central argument of a paper. It is my hope that the central argument of this paper, that timbral oppositions can generate musical form, will be a generator for further research in the diverse and nascent field of timbral analysis.

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BIBLIOGRAPHY


Stucky, Steven. *Second Concerto for Orchestra.* Conducted by Lan Shui and Singapore Symphony Orchestra. BIS, 2010. CD.


APPENDIX A: KEY TERMS

Attack Density (pg. 22): How many attacks (sounds) occur in a given period of time (horizontal). See François.

Breakthrough (pg. 48): Formal event that seems unprepared, such as a suddenly emerging sound source. See Sheinbaum.

Brightness (pg. 19): Quality of sound that describes its spectral centroid. Sounds with loud upper frequencies relative to the fundamental will be brighter.

Compound Timbre (pg. 20): A sound consisting of at least two inputs from one descriptor of timbre.

Formal Dissonance (pg. 57): A disagreement between concurrent formal structures generated independently by different musical elements, such as harmony or timbre.

Fulfillment (pg. 49): Formal event that, like a breakthrough, seems unprepared, but is in fact the resolution of previous, or possibly breakthrough, moments. See Sheinbaum.

General Timbre: (pg. 24): A recurring individual timbre, compound timbre, or timbral prolongation that maintains enough parameters over the course of a piece of music to be recognizable.

Registral Density (pg. 20): How many sounds occur within a specific range.

Roughness (pg. 20): Quality of sound that describes its overall dissonance level. See Malloch.

Sound Density (pg. 20): How many sounds occur in a given moment in time (vertical).

Suspension (pg. 49): Formal event that puts a process that was in motion on hold. See Sheinbaum.

Timbral Centricity (pg. 33): Formal scheme articulated by timbral oppositions in which another general timbre, called the central timbre, is heard as both in between and separate from the oppositional relationship.
Timbral Counterpoint: (pg. 29): Two or more superimposed timbral prolongations.

Timbral Opposition (pg. 33): Two or more general timbres that are related by a dichotomous relationship.

Timbral Progression: (pg. 33): Formal scheme generated by timbral oppositions in which the dichotomous relationship between general timbres gradually changes, or transforms entirely.

Timbral Prolongation (pg. 22): Section of music in which at least one prominent elemental building block or descriptor of timbre is held constant.

Timbre: Not precisely defined in this study, but described in terms of score-based information, such as pitch, dynamic, articulation, and sound source.

Width (pg. 20): Quality of sound that describes how wide or focused it is. This can be assessed based registral density, and sound density, and the number of instruments contributing to the sound. See Malloch.
APPENDIX B: SYMPHONY, FOR WIND ENSEMBLE
Duration: approximately 25 Minutes
In three movements:

I. Ascensions (4 minutes)
II. Contemplations (9 minutes)
III. Variations (12 minutes)

Score is Transposed

**Instrumentation:**
Piccolo
2 Flutes
Alto Flute in G
2 Oboes
2 Bassoons
6 Clarinets in B-flat (multiphonics in 1st)
Bass Clarinet in B-flat
2 Alto Saxophones in E-flat
Tenor Saxophone in B-flat
Baritone Saxophone in E-flat
3 Trumpets in B-flat (1st doubling on piccolo, straight mutes, harmon mutes)
4 Horns in F (stopped and straight mutes)
2 Trombones (straight mutes)
Bass Trombone (straight mute)
Euphonium
Tuba

Timpani

Percussion 1: Xylophone, Marimba (shared 2/3), Vibraphone (shared 2), Water Glasses (A, B-flat)
Percussion 2: Glockenspiel, Vibraphone (shared 1), Bass Drum (shared 5), Marimba (shared 1/3), Wood Blocks, Triangle (shared 3/6), Water Glasses (D, F-sharp)
Percussion 3: Marimba (shared 1/2), Triangle (shared 2/6), Snare Drum, Chimes, Rainstick, Water Glasses (G,C)
Percussion 4: Tom-toms (4), Whip, Claves, Suspended Cymbals, Maracas
Percussion 5: Crotales, Tam-tam (shared 6), Bass Drum (shared 2)
Percussion 6: Crotales, Thunder Sheet, Brake Drum, Tam-tam (shared 5), Triangle (shared 2/3), Ratchet

Harp
Piano

Contrabass
rall. . . . . . .  \[ \text{Rall. a tempo } \frac{3}{4} \text{ = 54} \]