Lewinian Transformations, Transformations of Transformations, Musical Hermeneutics

by

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Middletown, Connecticut April, 2012
To my parents,

but also,

to my first piano teacher:

Mrs. Barbara Wing,

without whom I would have nothing to say here,

and no reason to say it.
“Music induces the cryptographic sublime.”

-Carolyn Abbate
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CHAPTER 1

LEWINIAN TRANSFORMATIONAL THEORY

Introduction

It has been thirty years since Joseph Kerman published his contentious “How we Got into Analysis, and How to Get Out,” a sharp critique of music theory that points to formalism and positivism as primary offenses committed by the field.1 Music theorists, however, have since remained hard at work.2 Among the most conspicuous developments within these past few decades of music-theoretical discourse has been that of transformational and neo-Riemannian theories and analyses. In an article entitled “How we Got out of Analysis, and How to get Back in,” Kofi Agawu reevaluates Kerman’s claims in light of the previous two to three decades of scholarly musical discourse, noting that in the late 1980’s, despite Kerman’s assault upon formalist analysis, “an aggressive new formalism [emerged] under the banner of transformational or neo-Riemannian theory, inspired by Kerman’s one-time colleague, David Lewin.”3 Indeed, as Yosef Goldenberg’s bibliometric study of one of the field’s most prominent journals, the Journal of Music Theory, indicates, neo-Riemannian and transformational theories/analyses have been aggressively pursued subjects of study in recent years.4 Among the findings of his wide-ranging study is that the methods he categorizes as “neo-Riemannian” have, in the past two decades, verifiably become established as a

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1 Kerman 1980.
2 In his preface to Rethinking Music, editor Nicholas Cook clarifies, “Kerman’s characterizations [of analysis] were really caricatures; few except exhibitionists openly admitted to being formalists or positivists…” (vii).
3 Agawu 2004, 268. Agawu continues: “These and other formalist ventures are alive and very well, and have as good a chance of survival as any other musicological practice” (268).
4 Goldenberg 2006.
prominent mode of discourse within the discipline (as represented by the articles published in the JMT). Among specific analytical machineries, neo-Riemannian analysis is surpassed only by Schenkerian and set-theoretical analysis in the number of JMT articles that employ it in their findings. However, it is misleading to suggest an equation of neo-Riemannian theory and transformational theory as Agawu does or subsume transformational theory within neo-Riemannian theory as Goldenberg does. While I am certain their authors have far more sophisticated understandings of these theories than the foregoing remarks might suggest, these articles at times do not adequately capture the distinctions between neo-Riemannian theories and the broader category of transformational theories.

Neo-Riemannian theory originated as a triadic sub-theory of David Lewin's transformational theory, which Lewin explores most thoroughly in his 1987 *Generalized Musical Intervals and Transformations*, hereafter *GMIT*. This chapter covers some basic principles of some of Lewin’s formalisms (and ones inspired by his work) and discusses some of the implicit analytical outlooks Lewin sought to imbue his theories with. I begin with a summary of Lewin’s group-theoretical conception of relationships between musical entities. I then discuss what Lewin referred to as the “transformational attitude,” a specific analytical viewpoint advocated by Lewin and expanded upon by others for the use of his transformational ideas. Along the way, I shall explore some relevant items of work that have appeared in the years since the publication of *GMIT*. I shall then briefly discuss others' and my ideas concerning the present-day state of transformational analysis as a distinct sub-discipline of music theory at large, before going on in the next chapter to describe the neo-Riemannian formalisms that have blossomed in recent years.

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5 Lewin 1987 will be cited throughout as *GMIT*. 
Transformational Theory and Musical Group Structures

As Steven Rings acknowledges in the introduction to his 2011 book, *Tonality and Transformation*, though Lewinian transformational theory “is by now a familiar presence on the musicological landscape […] it remains a specialist subdiscipline within a specialist field, largely the province of initiates.”6 This is perhaps due to the fact that Lewin’s *GMIT* (as well as much of his other theoretical writing) might easily “leave the prospective reader with the impression of a formidably mathematical tone,” in the words of one of Lewin’s reviewers.7 Transformational theory can be potentially intimidating to those of us who – unlike Lewin and some scholars working with his theories – are not mathematical sophisticates. However, in his 1987 review of *GMIT*, John Rahn states that “this important book will influence the way music theorists think, partly by what it says, partly by how it says what it says. It is a work of *music theory*, not of mathematics, but music theorists will have to become accustomed to the mathematical rigor with which it presents its ideas.”8 Thus, one of the goals of this chapter as a whole shall be to introduce as intuitively as possible some mathematical preliminaries that are important to understanding transformational methods in musically relevant ways.

Lewin’s transformational machinery is essentially an instance of applied abstract algebra and much (though not all) of it relies on the algebraic theory of groups and group-like structures. Formally speaking, groups are families of functions that act upon specific families of objects.9 Additionally, a group contains a law of composition that

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6 Rings 2011. Rings’ volume is one of the few theoretical works that explicitly seeks to make Lewinian transformational theory more accessible. Satyendra 2004 is another foray in this direction and Cohn 1998a also seeks to serve as introductory material.
7 Slawson 1988. Slawson’s review is notable in that he comes at Lewin’s material from the perspective of music psychology.
9 Generically, these “families” are examples of sets. However, to use the term “set” is potentially clumsy/confusing in a music-theoretical setting because of the more familiar musical use of the term,
defines how group members can combine with each other.

An example of a group of transformations acting upon a musical space is the group of pitch class transpositions under modulo-12 equivalence, familiar post-tonal theoretical devices. Any pitch class can be related in a discrete way to any other; a certain unique transposition under mod-12 equivalence describes the relationship between the two pitches. A T₇ transposition, defined according to conventions of post-tonal theory, acting upon the pitch class “C” (or 0) always transforms “C” (or 0) into “G” (or 7). A pitch class transposition takes as its input a member of the family of pitch classes (under mod-12 equivalence) and returns another member of the family of pitch classes (under mod-12 equivalence). This is what is meant when it is said that pc transpositions map modulo-12 chromatic pitch class space onto modulo-12 chromatic pitch class space, and more generally, this is an example of mapping a set into itself. A group must satisfy four properties, which can be demonstrated with the familiar pc-transposition group of the standard post-tonal theory toolkit, {T₀, T₁, T₂, T₃, T₄, T₅, T₆, T₇, T₈, T₉, T₁₀, T₁₁} under mod-12 equivalence.

GROUP CLOSURE

Following Steven Rings’ ordering of group properties, the first property that a group satisfies is the property of closure, which Rings defines as follows: “the composition of any two [group] elements […] always yields another element in the same [group].”¹⁰ This can be written as follows: for any functions f and g in a group,

which describes the transpositionally and inversionally equivalent pitch collections that Allen Forte categorized in the standard formulation of musical set-theory. Thus, I follow GMIT in using terms other than “set” to refer to things that mathematically are, in fact, sets.

¹⁰ Rings 2011, 12.
$f \bullet g = \text{some other group member } h$ (the symbol $\bullet$ indicates the composition or combination of two items). Performing one pc-transposition and then following it with another will (in some sense) be equivalent to adding their subscripts together and performing the transposition that has as its own subscript this sum.

\[ e.g. \, T_1 \bullet T_2 = T_3. \]

**GROUP IDENTITY ELEMENT**

Second, an identity element must be present within the group. The composition of the identity element with another member $g$ of the group is equivalent to that member of the group alone. If $I$ is the identity function within a group, $g \bullet I = g$ itself. $T_0$ functions as the identity element in the mod-12 pc-transposition group. Performing a specific transposition and following it with $T_0$ is equivalent to performing that particular, specific transposition followed by no action.

\[ e.g. \, T_6 \bullet T_0 = T_6. \]

**GROUP INVERSE ELEMENT**

Furthermore, for any and every element in a group there is also an inverse element. The inverse of a group member $g$ is that group member $g^{-1}$ that cancels out $g$; after combining with $g$, it is equivalent to the identity element. This can be stated as follows: $g \bullet g^{-1} = I$. If the subscripts of two transpositions sum to twelve (or zero, in the case of $T_0$ and its inverse, $T_0$), those pc-transposition are inverses of one another. $T_{12}$, due to the condition of mod-12 equivalence, is instead expressed as $T_0$, the identity element.

\[ e.g. \, T_7 \bullet T_5 = T_{12} = T_0, \, \text{the identity element of the group. } T_7 \, \text{and } T_5 \, \text{are each} \]
other's inverses.

GROUP ASSOCIATIVITY

Finally, combining group members together must satisfy the **associative property**. Again, I offer Rings’ explanation: “given three group elements $f, g,$ and $h$, then $(f \cdot g) \cdot h = f \cdot (g \cdot h)$.\(^{11}\) Correspondingly, given any three or more pc-transpositions, combining (associating) them in different ways (while preserving left-to-right ordering) does not alter the result of the combination.

e.g. $(T_1 \cdot T_2) \cdot T_3 = T_1 \cdot (T_2 \cdot T_3)$

$(T_3) \cdot T_3 = T_1 \cdot (T_3)$

$T_6 = T_6$

GROUP ACTIONS ON A SET

A group performs certain actions on the set or space of musical elements over which it is defined. Furthermore, musical groups (specific families of musical actions) can be defined over a great variety of specific musical spaces. In the present context, groups shall consist of mathematically definable transformations that operate on musical entities. Lewin defines transformations as functions for which the output is a member of the same family of objects that the input is from; transformations can be referred to as functional mappings from a space $S$ onto itself. Musical transformations, then, are mathematical functions that map spaces of musical objects onto themselves. More suggestively, we could say that a musical transformation “carries” or “moves” (actively

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\(^{11}\) Rings 2011, 13. Rings’ lucid explanation of group properties can also be found in his dissertation (Rings 2006b, 7), which treats the topic somewhat more formally.
transforms or transfigures) a musical object so that it becomes another object of the same
genus.

A mathematical notation for describing a function f, if it is a transformation, would be to say to say \( f : S \rightarrow S \). In plain prose, the mathematical notation reads something like: “if you perform the function f on some object in the family S, the function will return some other object in the family S.” More generally, a function might map elements of space S to elements of space T \( f : S \rightarrow T \), but then it would not be a transformation. A transformation could thus describe relationship between pitches and other pitches, for example. A function could be made to describe relationships between distinct parameters such as pitches and dynamic markings or durations (a la Messiaen’s *Mode de valeurs et d'intensités*), but this could not formally be called a transformation.

The foregoing is simply a mathematical way of expressing the idea that transformations describe relationships between elements in the same musical space, the same musical category. These spaces can be intuitively understood as collections of musical objects of the same type, such as families of pitches, triads, various other harmonies, rhythmic durations, contrapuntal configurations or scale degrees, to name a few – hence, the great generalizing potential of Lewin’s conception.12 As Julian Hook has

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12 Formally speaking, groups of transformations are defined to act upon these sets, which are the specific families (or spaces) of objects as mentioned above. As Rings points out, however, the term space (as in musical space) deserves a closer look (2006b, 7n6). Lewin (1984) refers to given spaces of musical objects as being occupied by specific THINGS of a certain class (such as equally tempered pitches, pitch classes, time points, acoustical power spectra, justly-intoned frequencies). Musical spaces are filled with those objects (“things”) which we admit into them when we define these spaces. To define pitch space, for example, we cannot just say that pitch space is the space in which there is pitch and leave it at that. Pitch spaces contain the sets of pitches that our purposes see fit to consider – think of the differences between 12-tone equally tempered pitch class space vs.-72 tone equally tempered pitch class space vs a pitch space in which all possible frequencies are regarded as unique pitches.

Additionally, there are formalisms that allow transformations between objects of different types. An example that easily comes to mind are the “cross-type” transformations developed in Hook 2007a that describe transformations between triads and various types of seventh chords. Under this concept, a group of transformations (which consists of transformations between triads and triads, transformations between triads and seventh chords, and transformations between seventh chords and
remarked, this broad potential for applicability is one of the most powerful aspects of transformational theory. Many familiar musical contexts have group properties, and many kinds of musical relationships can be modeled with groups of transformations – most (though not all) of the transformations employed within this thesis will be able to participate in group structures.

Thus, to return to our familiar pc-transpositions, we can say that they form a transformation group of the order 12. These twelve functions (which are transformations) can be described as bijections. This means that a given pc-transposition will take every possible input pitch-class to a single, other pitch-class (mathematical injection). Furthermore, every possible pitch-class can be obtained by applying the given pc-transposition to some input pitch-class (mathematical surjection). Thus, a bijection is a function (which could be a transformation) that is both injective and surjective. Bijections relate every possible input to its own unique output, leaving no output values unused or used more than once. These bijective functions (which could be transformations) are called operations, and for theoretical reasons that will not concern us here, only transformations that are operations can participate in groups.

However, transformations that cannot participate in group structures can still be musically relevant, and in chapter 3, a family of transformations that satisfies only three out of four conditions for group membership will be formalized. How might these errant, misbehaving, non-group-able functions be musically relevant? As an example, seventh chords) acts on a space that is defined to include both triads and seventh chords.

13 Hook 2007a, 1. “Transformational techniques have been applied to pitch structures and rhythmic structures, pitch space and pitch-class space, melodic and harmonic constructions, tonal and atonal repertoires; expansive new ground seems to be broken with each passing year.” Twenty years after the publication of GMIT, transformation continues to be an actively pursued area of research although some authors (such as Julian Hook in this and other articles) have opted to alter the formalisms Lewin proposed.
consider the transformation I will call ResA440 (which is modeled after Rings' own ResC transformation), a transformation that sends all pitches to A440.\footnote{Rings 2011, 26. ResC sends all pitch classes to C. Note here the conceptual differences between infinite pitch space (as in ResA440) and cyclic mod-12 pitch-class space (as in ResC).} As a tuning exercise, my middle-school band director would instruct all members of the school band to play whatever pitch they wanted, before playing A440 (concert tuning pitch) on his cue. The initial cacophony of pitches would then resolve to concert tuning pitch. This musical procedure could be modeled by the ResA440 transformation. This and similar transformations cannot form groups since families of such resolving transformations do not have well-defined inverses.\footnote{Rings 2011, 27. Families of transformations that do not have well-defined inverses are called monoids.} That is, once every band student is playing A440, it is not possible to tell which random pitch a band member was playing before resolving to A440 if the only information known is that they were supposed to play A440 at the band director's cue.\footnote{Other examples of transformations without inverses that have been explored in the literature include various resolving transformations that send the members of the diatonic scale onto the closest pitches of, say, the tonic triad or the dominant triad – Rings' resV or resI, respectively (Rings 2011, 127) – showing preferred voice-leadings, or Lewin's “wedging” transformations, which drive pcs towards a central pc, away from the pc in tritone opposition to the central pc. These sorts of transformations cannot form groups since they do not have well defined inverses. For example, once every band student is playing A440, it would be impossible to tell what random pitch any one band member was playing before resolving to A440 if the only information you have is that they were supposed to play A440 as soon as the band director gave his cue.}

It is not so much that musical spaces and relationships are being redefined and injected with group theoretical principles. Rather, group structures are implied in numerous familiar musical situations – modulation around the circle of fifths is a familiar example. The triadic transformations of neo-Riemannian theory, another tool employed in this thesis, can also participate in group structures, and can provide elegant and highly precise models of triadic motion. Having now developed a sense of some the basic formal definitions of Lewinian transformational theory, we can begin now to
explore how Lewin invested his mathematical concepts with sense of poetry and significant avenues for musical sensitivity. We have already introduced the formal apparatus of transformational theory and how it works within a “space” of objects. The next crucial question Lewin poses is this: what happens when we put ourselves inside that “space?” Suppose we imagine ourselves to be passengers on the transformations that provide transit over the musical space of a piece. Where and how do we “go?”

**The “Transformational Attitude”**

One of the key aspects of David Lewin's work on musical transformations is what he refers to as the “transformational attitude,” a particular analytical perspective Lewin advocates for the use of his theories in order to illuminate music. This analytical viewpoint, which has largely permeated the transformational and neo-Riemannian discourse, provides the central methodological orientation that drives the use of the formalisms within this thesis. Lewin's own Figure 0.1., which demonstrates the basic situation modeled by transformational theory, is shown below.17

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17 *GMIT*, xxix. This figure is one of the most commonly reproduced diagrams in the transformational theory literature.
Lewin’s figure identifies two musical objects, \( s \) and \( t \) (be they pitches, pitch-class sets, chords, harmonies etc.), and the interval, \( i \), that describes a relationship between them.

As Lewin notes, “we intuit such situations in many musical spaces [or contexts]” (GMIT, 159). In outlining this aspect of his methodology as he does, Lewin intends to merge intervallic observations with a certain analytical mindset, one that asks: “If I am at \( s \) and wish to get to \( t \), what characteristic gesture should I perform in order to arrive there?”

For Lewin, transformations model specific actions or doings, metaphorical motions through musical spaces across certain distances or intervals, or even forces that urge such motions and transformational thinking represents a methodological shift away from what Lewin dubs the Cartesian perspective.

**DESCARTES AND LEWIN, INTERVALS AND TRANSFORMATIONS**

According to Lewin, the Cartesian perspective considers the interval as a static measurement or calculation of the distance between two musical points. This perspective, for Lewin, tends to throw the music into a state of disembodiment in which musical entities are “out there,” away from the analytical persona. This might be viewed as part of an implicit effort to trump some criticisms that music theory's detractors have levied against what they unflatteringly identify as the structuralist, positivistically-leaning intellectual climate of post-war music theory. Lewin's transformational attitude is a

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18 *GMIT*, xxx. This sentence is one of the most commonly cited phrases in the transformational theory literature.

19 As mentioned earlier in this chapter (footnote 2), these characterizations of music theory have been influential, but ultimately are oversimplifications of the theoretical enterprise. Lewin (1986) writes, “In a superficial view [...] Babbitt is ‘scientific’ and ‘objective,’ while the next generation is ‘poetic’ and ‘subjective.’ The superficial view is not exactly wrong, but it is very far from adequate to engage the critical issues at hand, issues which it hopelessly trivializes” (383). As Lewin's dedication to *MFT* reveals, Babbitt and Forte (two post-war theorists who have been extensively attacked by critics such as Kerman) were major influences on Lewin's thinking, though he acknowledges the reasons why their work has been associated with positivism and structuralist thinking. At the same time, I sense in *GMIT*
highly dynamic concept by which formalist analysis seeks to engage ideas of embodiment, examining certain sorts of characteristic musical “moves,” motions and gestures and the sensations and intuitions they elicit. Lewin introduces an analytical persona who “can regard the situation actively, like a singer, player, or composer, thinking: 'I am at s; what characteristic transformation do I perform in order to arrive at t?'” (GMIT, xxxi). The interval between points $s$ and $t$, rather than being a vector-like measurement extending between $s$ and $t$, can then act as a cognitive stand-in for the transformation that transports both music and musical auditor (listener, performer, analyst, etc.) from $s$ to $t$. The, the transformation that carries ($transforms$) a musical object across a specific interval “is a name for 'a way of moving' (from anywhere to somewhere else), rather than a relation between fixed points in musical space; it lables [sic] a *res fabricans* rather than a *res extensa.*”

While it has been suggested that GMIT presents an anti-intervallic methodological shift across its narrative, my views converge partly with those of Steven Rings, who proposes that “[Lewin] wants us not to replace intervallic thinking but to become more aware of its Cartesian bias, and to be self-conscious about that bias whenever 'thinking intervallically' in some analytical context.” As Lewin himself admits towards the end of his 1977 article that he is ambivalent as to whether or not

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20 Lewin 1977, 234.
21 Rings 2011, 17n22. The views I share with Steven Rings on the subject of the intervallic-transformational dichotomy differ somewhat from those of published statements in Klumpenhouwer 2006 and Satyendra 2004, which cast Lewin's transformational work in an anti-Cartesian, anti-intervallic light. Rings 2011 (17n21-22) points out that Lewin continued to pursue intervallic thinking in generalized interval system (GIS) formalisms, suggesting that Lewin did not intend to renounce intervallic thinking, but wanted instead to warn against employing such thinking in static, disembodied ways. Furthermore, Lewin supplement it with a related but broader theory of transformations, since not all transformational contexts admit of intuitive intervallic representations.
transformational thinking ought to entirely replace intervallic thinking. In GMIT, he seems more certain of his position: “we do not have to choose either interval-language or [transformation] language; the generalizing power of transformational theory enables us to consider them as two aspects of one phenomenon.” Thus, Lewin does not intend to falsely dichotomize intervals and transformations, and one could even question Lewin's dichotomy between transformational and Cartesian thought.

Indeed, Lewin has been criticized for his reading of Descartes. As Julian Hook remarks, “motion, for Descartes, is a primary property of an object, as essential to its existence as its size, shape, and location in space.” As used by Descartes, the term *res extensa* refers to corporeal substance: things or objects with palpable, manifest qualities. And if these qualities include motion or other gestural attributes that an object can manifest, the “things” that Lewin's transformational theories inquire into cannot be truly counterposed against *res extensa*. However, authors such as Rings continue to invoke the language of the Lewinian/Cartesian dichotomy for its heuristic value in distinguishing between “reified” musical points/objects (such as set-classes, motivic fragments, harmonies etc.) and the relations that link them, between analyzing statically as an outside observer and analyzing with “the attitude of someone inside the music,” moving and gesturing along its surface.

As Lewin's writings imply, the language used to communicate theoretical and analytical ideas is of great importance. This is one reason why Lewin expends great energy explaining and clarifying the transformational attitude in the way he does.

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22 Lewin 1977, 235.
23 GMIT, 160.
25 GMIT, 159. Rings states the key dichotomy this way: “a transformational analyst is interested in the 'how' of a given musical gesture more than the 'what' of the resulting pitches and intervals.” Rings 2006b, 50.
Furthermore, it is important to stress that such a perspective is by no means inherent to the formalisms that he advances. As Rings notes, “transformation’ is a term with a specific mathematical meaning, which it retains whether one adopts Lewin's transformational attitude or not. The technical content of Lewin's theory thus does not require the transformational attitude.” Conceiving of intervals as transformations rather than mere distances imbues these relationships between musical objects with an active and dynamic quality (consider the verb “to transform,” vis-à-vis the noun “interval”). Furthermore, this activity/dynamism is that of music as a kinetic, embodied phenomenon in which the persona of the musical auditor/analyst becomes embedded in and attached to the music, borne along its objects and structures via various characteristic gestures.

Thus, Lewin's transformational theories encourage us to metaphorically inhabit the music we use it to analyze, and an important aspect of Lewin's method is the way it allows metaphors of space and distance, movement and action to invigorate both our deployment of formalisms and our understanding of pieces. There is a quality of expressivity and engagement with musical and analytical metaphor that fit nicely into Lewinian transformational ideas. As Richard Cohn's review of GMIT observes, “this marks a departure from the positivist tenet, found in much music-theoretic discourse, that it is possible and desirable to discuss intervals in a context-neutral objective language.” In today's criticism-oriented, interpretively and hermeneutically inclined

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26 Rings 2006b, 45. Language, presentation and analytical voice are crucial to Lewin's project and these aspects of his methodology work in intimate partnership with purely formalistic ideas in his analyses. This commitment is apparent even in Lewin's earlier writings. In a 1969 article, he writes, “The task of the analyst is "merely" to point out things in the piece that strike him as characteristic and important (where by "things" one includes complex relationships), and to arrange his presentation in a way that will stimulate the musical imagination of his audience” (Lewin 1969, 63). Analytical insights and the ways by which they are shared are equally important to Lewin.

27 Cohn 1989.
music-scholarly climate (a situation that Kerman and others called for), it seems that Lewin’s work, despite its sometimes forbidding formalisms, remains a fountainhead precisely for the reason that Cohn states.

In a 1982 article appearing in *Perspectives of New Music*, Lewin explains, “[the] transformational outlook introduces an attractive kinetic component into theories that suffer from a static character when "dominant" et al. are conceived merely as labels.”28 As Rings elaborates, “[the] transformational attitude is attractive precisely because it seems to go right to the heart of music’s subjective, active, processual core.”29 Lewin’s central idea is that musical intervals and transformations take us from place to place in the music; and when they are used and written about sensitively, they can model the things we do as performers or listeners when we engage with pieces of music. Indeed, music is something that we *do*, and whether we engage with it as performers or listeners or analysts (or some combination thereof), it is in no way a passive phenomenon. Music consists of actions, or “doings,”30 and as such, analysis needs to serve as more than just an act of labeling, puzzle-solving or illustrating theoretical concepts. Among the ways analysis and theoretical tools can be truly informative is by aiding us in the inquiry into the complex and synergistic relationships we and pieces of music form with one another as we play or listen.31

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28 Lewin 1982a, 329.
29 Rings 2006b, 46.
30 This phrasing and interpretation of Lewin comes directly from Rings 2006b (45).
31 Lewin on theory and analysis: “analysis is really antithetic to theory. A theorist, looking at a piece, is interested in its generic attributes: it is in A major, it is in ternary form, it has a *Terzfigur* as *Urlinie*, it uses this twelve-tone row, it exploits such-and-such properties of the row, etc. The analyst is interested in its specific attributes, in a nutshell: what is *it*?” (Lewin 1969, 62-63). Though I think Lewin is excessively polemical here, the overarching questions he says theorists/analysts should pose remain relevant: what is the nature of the piece? What, and how, does it mean?
When Lewin places the analyst “inside” the music, what exactly does he mean? In conceiving of an interval or transformation as a *res fabricans* (literally, a thing fabricated, or made), it seems that he is alluding in part to the act of making music. Implicit in the transformational attitude is the idea that transformations, as models of musical actions or “doings,” have a performative quality. This leads Rings to suggest that, “we can understand transformational ’doing’ as related (literally or metaphorically) to our *physical actions* as musical performers.”

Rings calls this the *concrete interpretation* of the transformational attitude.

This *concrete interpretation* in which transformations are analogous to the actions and related thoughts of performers is evident in numerous passages throughout Lewin's oeuvre, such as here:

In producing a familiar tune vocally, I execute a certain succession of familiar "moves" with my voice, rather than producing primarily a succession of pitches. It is the "moves" of which I believe I have far the strongest (psychomotor) memory, only secondarily (and intellectually) the "intervals" which label those moves, and even less the various absolute pitches I span by those intervals.

This focus on the “moves” that occur in music takes center stage in Lewin's

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32 Rings 2006b, 46.
33 Lewin 1977, 233-234.
transformational ideas, and in its most literal form, it is expressed in terms of the kinetics and the physicality of the “moves” a performer makes.

Consider Lewin's exploratory vignette of Schoenberg's op. 19 no. 6. Lewin identifies a motivic falling minor ninth, the successive occurrences of which appear at transpositions given by the intervallic structure of the repeated opening right-hand chord. His figure 7.1 is shown below (figure 1.2), and the score to the piece follows (figure 1.3). Following the lead of Lewin's analysis, I can adopt a transformational mindset here and consider the falling minor ninth/sixteenth gesture not as an epiphenomenon of two privileged pitches, but instead as a characteristic transformation to which I choose to attend. These particular transformational “doings” directly relate to my physical actions as I play the piece; they square nicely and quite literally with my actual, pianistic “doings.” Here I explore how Lewin's analytical observations about the piece highlight some of the natural perceptions a player can form while performing it.

Figure 1.2 Lewin's figure 7.1 from GMIT, analytical representation of Schoenberg op. 19 no. 6

\[ -5 \] \[ -9 \]

\[ (\text{mm. 3-4}) \]
\[ (\text{mm. 4-6}) \]
\[ (\text{m. 7}) \]

\[ -14 \]

34 GMIT, 159.
Figure 1.3 Score of Schoenberg's op. 19 no. 6
When I reach the end of mm. 3, I lean into the high e-natural in the left hand in an effort to realize the crescendo, relaxing into the right hand D-sharp that follows. The gesture is passed from one hand to another, and my attention follows. As I play, my left-hand crescendo into the high E-natural invests it with a particular intensity, although as per Schoenberg’s notated dynamics it is – in terms of sheer amplitude – probably softer than the right-hand D-sharp that completes Lewin’s falling minor ninth. Furthermore, because I crescendo into the E-natural and then tie it into the strong beat of the next bar, the metric accent that occurs during the tie invests the tone with additional energy – that is, if I attend to the notated meter. My focus might then travels to the piano D-sharp in the right-hand, due to its physical amplitude, rather than the pianissississimo left-hand D-sharp that occurs simultaneously above it. I feel this motion from E-natural to the right-hand d-sharp as a release of tension, as a “fall from,” rather than a “dive towards,” because of the weak metric position the D-sharp comes in on and the way my attention is directed towards the intentional peak of the left-hand E-natural.

The next falling minor ninth starts on the upbeat to mm. 5, continuing through mm. 6 and is somewhat more straightforward than the occurrence of the gesture in mm. 3 – 4. This gesture becomes salient to me as a player since it occurs as I change the position of my right hand for the first time in the piece. Until this point, I have not had to move my hand away from the <A F# B> trichord, but in mm. 5 my hand falls down

35 The idea that the written meter cannot always be taken for granted in analysis is pointed out in Malin 2008. Malin touches on this idea in connection with “Unterm Schutz” from Schoenberg’s roughly contemporaneous Book of the Hanging Gardens op. 15, pointing out that to attend to the notated meter and feel it a certain way is a performative/analytical choice. One implication is that some kinetic and gestural intuitions regarding meter might be opaque to some auditors – that such observations might come primarily from inhabiting the perspective of a performer (rather than that of an audience member).

36 Here, the term intentional does not mean “on purpose,” but instead refers to consciousness being directed towards a percept in the phenomenological sense. This clarification is drawn from that which appears in Rings 2006b (56n17).
to the \(<C \ F \ B-flat>\) trichord in the treble clef. And though my entire hand has moved, the falling minor ninth from the b-natural of the right hand chord at the upbeat to mm. 5 to the B-flat of the \(<C \ F \ B-flat>\) trichord is most salient because, when I land on the \(<C \ F \ B-flat>\) trichord, I repeat the C and F of the \(<G \ C \ F>\) trichord already held in the left hand. B-flat is salient to me as a performer because I attend both to its novelty as a pitch and the physicality of the gesture required to reach it. Furthermore, my classical training has conditioned me to tend to voice to the uppermost notes of chords played in the right hand.

The third and final falling minor-ninth at mm. 7 is the most straightforward of these gestures (though this time, it is really a descending minor sixteenth). For the listener, the motion from the treble clef D-natural to the bass clef C-sharp is the most aurally available of the falling minor ninth gestures. Its occurrence is unadorned by other pitches, laying the falling minor-ninth gesture aurally bare. As such, it culminates a process of the falling minor ninth becoming increasingly salient to the attentive listener. My performative evaluation of Lewin's analysis demonstrates how a particular performed gesture can register as an intentional presence for the performer (as in mm. 3 – 4), a kinetic presence (as in mm. 4 – 5) or an aural presence for the listener (as in mm. 7), as well as combinations of the above. Thus, thinking about the gesturality and physical embodiment suggested by Lewin's analysis leads naturally from exploring the physicality of performing the music to engaging other observations and intuitions about processes of intentionality, or directed consciousness, by which both performers and listeners perceive the music. The same can be said of transformational methods at large.

Rings clarifies, there exist: “many instances in the transformation theory literature […] where such a literal, 'real-world' interpretation of the transformational
attitude does not work. The transformations in many analyses do not correspond in any obvious way to physical things some musical actant does out in the world to execute a passage.\footnote{Rings 2006b, 49.} However, Lewin still invokes performance language even when the transformations he asserts are quite unlike the actions of performers. Rings points out that the “performance” of these transformations is figurative; we “perform” them in our musical consciousness “in a manner analogous to physical performance.”\footnote{Rings 2006b, 50. Emphasis mine.} These mentally performed transformational processes do not necessarily map cleanly onto physical gestures; rather, they describe some of the analytical perceptions and intuitions an idealized musical percipient can have about a piece of music.

\textit{ON BEING “INSIDE” THE MUSIC: TRANSFORMATIONS AND THE LISTENER}

We need not look very far for examples of transformations that involve more than the concrete, literal take on the “transformational attitude.” Consider the conspicuous triadic transposition that marks the opening of Beethoven's Piano Concerto No. 4, Op. 58, shown below. This is a highly unusual opening gambit in a few regards. In a radical move, Beethoven begins the concerto not with a typical, lengthy orchestral exposition, but with five bars of G-major material for the solo pianist, concluding on a half cadence. A memorable harmonic event ensues; the orchestra's parallel phrase begins on a local tonic of B-major, a harmony whose chromatic third relationship to the
opening tonic and immediately preceding dominant triads infuses the orchestra's entrance with great aural potency. Transformation labels can easily be assigned to relate the adjacent D-major and B-major triads or the G-major and B-major tonic triads. The move from D-major to B-major could be expressed transpositionally as a $T_3$ move while the move from G-major to B-major could be captured as a $T_4$ transposition. We might also invoke a tonal transformation, DOM, to describe our sense of hearing the pitches of the dominant D-major as though they are being “urged” towards the opening G-major tonic as though compelled by tonal forces.\footnote{In this connection, see GMIT, chapter 8.}

Already, the most literal, first-person take on the transformational attitude is problematic. One reason for this is that any sense of some sort of a “doing” here cannot be circumscribed by any one “I.” Rather, the move to B-major is an emergent action of the entire performing ensemble (soloist and orchestra) that occurs when one performing unit (soloist) ends their actions and another performing unit (orchestra) starts theirs.\footnote{This distinction between individual and collective actions is addressed in Rings 2006b (48n5).}

Furthermore, the sense of tonal gravity is not an innate characteristic of the raw acoustic signal generated by a performance of the music in figure 1.4. Tonal gravity is instead a
construction of the listener. Thus, while the objects related by the transformations of
figure 1.4 obviously result from and correlate with the “doings” of performers (like all
musically relevant transformations), understanding figure 1.4 in a more comprehensive
fashion involves inquiring into the mental actions of listeners. For example, we might
remark on the voice-leading-smoothness and aural unexpectedness of arriving at B-
major from D-major or we might remark on how the abrupt move to B-major disrupts
the initial sense of tonal centricity directed towards G-major. In any case, to engage with
this transformation in a musical way, interpreting it in a concrete fashion is insufficient;
we must also treat it as an event bound with perceptual entailments.

Thus, while Lewin's transformational attitude is that of an active participant
inside the music, transformations must also be said to also model mental “doings” that
actively engaged listeners “perform” when they internalize and reflect on the gestalts
given by the music. In the Beethoven example above, what we attend to is not so much a
characteristic motion (in the most literal sense) but a characteristic triadic “sensation,” a
characteristic “move” within an abstract triad-occupied space. In this case, the
transformational “doing” can certainly be seen as the result of the actions of
performers. But more likely, the transformation by which the piano's D-major is carried
to the orchestra's B-major models a listenerly “doing” that groups two adjacent triadic
sounds into a transformational gestalt by virtue of proximity in time. As this discussion
seeks to suggest, the first-person action of a transformation can refer to what the
listener “does” cognitively and perceptually.

This more diffuse understanding of what transformations help to model
underscores a significant quality of Lewin's writing. With respect to the semiotic
tripartition of Nattiez, Lewin's analytical work tends to carry a strongly esthetic
That is, his analytical projects focus more on opening the ears of his audiences rather than examining procedures of compositional creation (poietics), as numerous commentators have noted. And although transformational theory cannot be consigned to be understood solely in esthetic terms, it is clear that a major element of Lewin’s program is to uncover relational hearings of pieces and ways of modeling them.

Indeed, Lewin’s oeuvre is marked by a deep concern for issues of musical perception and directed listening, from speculation about a cognitive algorithm for hearing music in his phenomenology essay to the rigorous hermeneutic analyses of Studies in Music with Text. In keeping with this program, transformations can certainly be understood as corresponding to particular sensations we have or can have as we engage pieces of music as auditors. But this does not mean that transformations are fruitful only to the extent that they can model those observations that are readily available in a perceptual sense. Lewin cautions, “one should not ask of a theory, that every formally true statement it can make about musical events be a perception-statement. One can only demand that a preponderance of its true statements be potentially meaningful in

[41] Jean-Jacques Nattiez’ (1990) semiotic tripartition borrows from some conceptual constructs native to linguistics, bringing them to musical scholarship. While a full exploration of Nattiez’s ideas is far beyond the scope of this footnote and this essay, the semiotic tripartition posits three perspectives from which music can be studied. Taruskin (2011) identifies them as follows: the poietic level (the composer’s perspective), the esthetic level (the listener’s perspective), and “the so-called neutral level—that of ‘the message (or the music) itself’—that for so long has preoccupied the theory of music. That level is the fictive one, the standpoint of the omniscient observer—God’s standpoint” (182). Taruskin’s final points regarding Nattiez’ problematic neutral (or immanent) level represent current thinking of recent years. As Leo Treitler (1990) puts it, “The notion of an ‘independent,’ ‘objective’ or ‘contextual’ analysis, based only upon observation of the work itself, and framed in categories and concepts suggested only by the work, is an illusion. The work of art has no existence apart from any interpretation of it” (69). Typically, Schenkerian analysis has been closely associated with immanent claims, but as Temperley (2011) argues, even Schenkerian theory might be more sensitively evaluated as “a theory of composition (describing composers’ mental representation) and as a theory of perception (describing listeners’ mental representations)” (146).

[42] Rings, for example, calls Lewin’s 1986 phenomenology essay “one of the most strenuously esthetic of all music-theoretic writings in the last quarter century” (Rings 2006b, 26n30). Bo Alphonce’s (1988) review of GMIT praises its analyses for their potential to sharpen hearings of the pieces they examine. On the other hand, as Michael Leslie Klein’s Intertextuality in Western Art Music phrases it, GMIT “makes few explicit connections between a theory of transformations and the act of composing” (23).
sufficiently developed and extended perceptual contexts."\textsuperscript{43} While this remark has been criticized at least once as being overly inclusive, one implication of this warning is that the formal statements of a transformational analysis, if sensitively applied, can help to expand the listener's perceptual horizons.\textsuperscript{44}

\textit{ON BEING “INSIDE” THE MUSIC: ABSTRACT MOTIONS IN ABSTRACT SPACES}

As a further example, consider the transformations Lewin asserts in his analysis of Stockhausen's Klavierstück No. III in \textit{Musical Form and Transformation} hereafter, \textit{MFT}. This analysis examines various permutations of \{0,1,2,3,6\} pentachords in the piece and the ways they morph into and overlap with one another.\textsuperscript{45} The transpositional and inversional operations Lewin uses to dissect the atonal pitch content and to narrate the form and internal syntax of the piece are neither aurally obvious, nor do they readily correspond to particular kinetic gestures. But as Rings argues, the atonal transformations Lewin employs in this and other analyses “might indeed become descriptive of one's mental activity when listening to the music.”\textsuperscript{46} Thus, the intentional dimension of transformational theory extends beyond what can be immediately heard to encompass those observations about the music that are products of focused acts of musical intellection.

Metaphors of motion and space continue to assert themselves even in the most abstract transformational analyses Lewin pursues, such as the Stockhausen analysis. This is most readily apparent in the map-like transformational networks that are a staple of

\textsuperscript{43} \textit{GMIT}, 87.
\textsuperscript{44} Slawson 1988, 212.
\textsuperscript{45} \textit{MFT}, 16-67.
\textsuperscript{46} Rings 2006b, 60.
the discourse. By situating a piece’s musical objects and the transformations that relate them in a network, transformational analysis identifies abstract spaces of objects and transformational “moves” that help to identify “broader families of musical phenomena to which the transformations in the model might belong.”47 In this way, transformational analysis is not confined to purely temporal blow-by-blow narrativity, nor must it rest with specifying the abstract spaces that pieces of music realize. Instead, the temporal and spatial concerns can be merged as in the Stockhausen analysis; the narrative of musical events is projected onto the abstract space in which they occur. Lewin 1982 notes that transformational spaces are paradigms that may or may not be expressed or explored in totality over a given piece.48 In such a way, they outline possibilities for characteristic musical “moves” or gestures, broadly-conceived, and the ensuing analysis tells the story of how the music moves through the terrain of possibilities contained within the transformational space. Furthermore, the entirety of a transformational space need not be depicted in representations. Consider Lewin’s two transformational networks of Webern’s op. 27 piano variations, mvt. II.49 GMIT’s figures 8.12a & b, given here as figures 1.5a & b, give two accounts of the organization of the first several bars of the movement.

47 Cook 2005, 122.
48 Lewin 1982a, 335. This passage was brought to my attention by Cook 2005, 122.
49 GMIT, 191.
Figure 1.5 a) Lewin's figure 8.12a from *GMIT*
b) Lewin's figure 8.12b from *GMIT*

Figure 1.5a gives a purely temporal, blow-by-blow narrative. The jagged peaks of the graph capture the frenetic, pointillistic leaps from pitch to pitch that make this piece so distinctive. However, figure 1.5b organizes the pitch content around the abstract idea of “inversion-about-A-natural,” while maintaining the sense that reading the network
from left to right corresponds to moving forward in time. We can think of “inversion-about-A-natural” as a transformational relationship that coordinates the pitch-successions of Webern’s piece. Recognizing the inversionsal relationships helps to clarify that the two hands’ activities center around an A-natural fulcrum. We can imagine drawing the lateral midline of figure 1.5b as an axis of reflection for the network in the same way that a Rorschach inkblot is folded down its middle. Importantly, though the network of figure 1.5b understandably only displays those pitches that are played, there is a strikingly clear sense in which the abstract transformational relationship of “inversion-about-A-natural” acts as a structural force; we can imagine a more general space that displays all possibilities for inversion-about-A-natural. Indeed, the inversionsal axis concept can be followed through the entire piece, revealing that its pitch paths are inversionsally balanced around A-natural. Even if, as I believe, the transformational insights of figure 1.5b come largely from intellectual reflection regarding the pitch structure of Webern op. 27 no. II, there is a strong sense in which the inversionsal-balancing force in the Rorschach-like space brings great coherence to the pitch paths in this piece. Understanding the inversionsal balance intellectually makes a tremendous difference in a kinetic and aural sense to any would-be performer of the piece who must negotiate many leaps that are difficult to play accurately and memorize otherwise. Thus, even in rather abstract transformational analyses and network representations, path metaphors and spatial qualities that structure the transformations inform the analysis and can serve as aids to guide subsequent playing or listening.50

Ultimately, the tripartite understanding of the transformational attitude that I

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50 Indeed, recent scholarship has suggested that transformational network representations do not go far enough to demonstrate the active, insider transformational attitude and have made use of video animations capturing musical actions in transformational spaces, e.g. MTO issue 15 vol. 1, special issue, “Animating the Inside.”
have sketched should not be seen to consist of three discrete and separable parts. Transformational relationships and the spaces they structure can model literal gesturality, directed listening and intellectual observation, all of which cross-inform one another. These understandings of transformations are alike in that they rely on, albeit differently, senses of action, motions along paths, and structured space (metaphorical or otherwise) that are central to Lewin's dynamic transformational concept.

Final Thoughts

One of the reasons for the continued popularity of Lewin's transformational methods in current music theory is its adaptability to what Rings calls “interpretive play.” While not inherent to the mathematics of Lewin's formalisms, transformational theory's frequent engagements with spatial map and path metaphors as well as metaphors of forces and movement help to preserve its relevance in light of the hermeneutic thrust introduced to music scholarship in the 1980's by figures such as Susan McClary. However, not all are satisfied. For example, while the transformational attitude seems to suggest useful interpretive angles, Julian Hook's 2007 review of reprints of *GMIT* and *MFT* has remarked that perhaps too much has been made of it. Dmitri Tymoczko has pointed out instances where Lewin's mathematics might not be adequate to model musical intervals, and notably criticizes the Lewinian model's agnosticism to the directionality of intervals and transformations. Among the most pertinent criticisms is that Lewin never really made clear how to “do” transformational theory. As Roeder points out, Lewin carefully justified his selection of objects and

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51 Rings 2006a, 123n24.
52 Hook 2007b, 172-177.
53 Tymoczko 2009.
characteristic transformations, but remained unclear on how students of his ideas might themselves select objects and transformations. Furthermore, Lewin was not entirely clear on the nature of the transformational attitude. Much of this chapter should make clear the broadness of the idea and the attendant difficulty of settling on an interpretation of it. Yet another question that remains unanswered is that of agency. Who is the transformation insider, really? Is it (problematically) the piece itself, as some of Lewin's analyses, particularly those in *MFT*, seem to suggest?

Many issues, of both formalism and analytical outlook, have not been completely settled. Scholars continue to revise and add to Lewinian methods, some departing from Lewin more than others. One point of agreement is that Lewin leaves behind a multitude of open questions about transformational theory, an openness that invites the creativity and insight of the analyst. As Hook explains:

> The enormous differences in style and approach from one Lewin analysis to another … [read] as signals that he saw the field as a living organism, forever a work in progress or even in infancy, growing and maturing in response to the quirks and complexities of the musical works or phenomena under consideration.

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54 Roeder 2009.
55 Hook 2007b, 186
CHAPTER 2

NEO-RIEMANNIAN TRANSFORMATIONS

Introduction

Basic neo-Riemannian theory (hereafter, NRT) formalizes relationships between consonant major and minor triads from the vantage point of Lewinian transformations, rather than more traditional tonality-based approaches.\(^1\) It has become something of a trope in the neo-Riemannian discourse that NRT “arose in response to analytical problems posed by chromatic music that is triadic but not altogether tonally unified.”\(^2\) A quick scan of the results of a web query into NRT will show that mainstream NRT is overwhelmingly represented by discussions of chromatically charged passages and pieces by Schubert, Wagner, Liszt, Brahms and a number of other nineteenth century composers.\(^3\) Many interesting highly chromatic passages in these repertoires fail to respond analytically to Schenkerian and other tonality-based methods. Analytical tools based on tonal hierarchies declare such passages to be “idiosyncratic,” as Cohn remarks, since tonal gravity often seems to be in suspension in such music.\(^4\) The music that NRT has most often studied deeply problematizes the tonal/atonal binary embedded within music-analytical habits of thought. While sophisticated methods for atonal analysis and tonal analysis exist, these tools do not easily account for triadic music that cannot be

\(^1\) However, some contributions to neo-Riemanian theory have also addressed other chord types. Callender (1998) and Gollin (1998), for example, address transformations among seventh chords. Douthett and Steinbach (1998) develop transformational spaces that include some non-invertible tertian chord species.

\(^2\) Cohn 1998a, 167.

\(^3\) Cohn (1998a, 169) recites a number of descriptors that have been applied to these repertoires: “unstructured,” “incoherent,” “indeterminate,” “coloristic,” “disjunct,” “arbitrary,” or “aimless.” The limited insights these imprecise designations offer for the music they seek to describe helped to motivate the neo-Riemannian project, which generally strives for a more systematic way to discuss chromatically charged triadic music.

\(^4\) Cohn 1996, 11.
comfortably described as either diatonically cohesive or atonal. Thus, a picture of these repertoires emerges which either describes them in terms of tonal disunity, or in terms of unsuitability for atonal analysis. Scholars working with NRT instead asked how we might describe this music in the positive: “if this music is not fully coherent according to the principles of diatonic tonality, by what other principles might it cohere?”

Neo-Riemannian theory emerged out of Lewin's transformational work on triadic and trichordal harmony in the 1980's. This work began with Lewin's 1982 article "A Formal Theory of Generalized Tonal Functions,” in which he explores trichordal transformations in great generality. This early approach examines serial transformations of a set of any three pitch-classes, called a “Riemann System” (one possibility for which could be the consonant triad). This work develops a mathematical account of mode-reversal (inversion of a consonant triad about the root-fifth dyad) untethered from ideas of harmonic functionality as part of the discussion of the more general idea of what Lewin later described as contextual inversion. Contextual inversion here refers to the inversion of a triad about any one or two of its constituent pitches rather than inversion around an axis fixed in pitch-class space. Additionally, Lewin explores what he calls the shift group of operations on adjacent triples in a pitch-class space of alternating major and minor thirds as shown in the figure below. Lewin's shift transformations move the window of the above figure, bracketing some particular triad, to the left or right by n places.

5 Cohn 1996, 169.
6 Lewin 1982b.
Thus, shifting the window one position to the right from the bracketed C major yields e minor; shifting one position in the opposite direction yields a minor. Shifting the window two positions rightward from C major yields its dominant, shifting the window two positions leftward yields C major's sub-dominant. Lewin's tonal functional transformations SUBM (which transforms a submediant triad into its tonic), MED (which transforms a mediant triad into its tonic), SUBD (which transforms a subdominant to its tonic) and DOM (which transforms a dominant into its tonic) receive their first in-depth treatment here in the context of window shifts as in figure 2.1. In GMIT, Lewin further explores these ideas, explicitly defining them as actions on consonant triads (or Klänge, the term Riemann used) rather than his earlier “Riemann Systems.” In GMIT’s active, first person transformational perspective, Lewin describes triadic transformations as “something one does to a Klang, to obtain another Klang.”

Lewin's work invokes some resources from atonal theory and suggests their relevance to triadic music, though as Richard Cohn notes, “[while] triads and diatonic collections are among the objects that they produce, the transformations proposed in the 1982 article are definitionally and conceptually independent of the system of diatonic tonality normally signified by those structures.” While Lewin's appropriation of mathematical tools for studying triadic harmony is indebted to mid-twentieth century American music theories, it draws on some of the ideas developed by late nineteenth century

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7 GMIT, 177.
8 Cohn 1998a, 170.
century German theorists, including (but not limited to) Riemann.\(^9\) Indeed, the explorations of harmonic Verwandtschaft by theorists other than Riemann can be identified as conceptual forebears to many concepts found in the current NRT discourse. Most prominently, “the system of Schritte and Wechsel introduced in Oettingen 1866 and expanded in Riemann's Skizze einer Neuen Methode der Harmonielehre of 1880,” and the various Tonnezte that appeared as early as Weber’s ”Table of the Relationship of Keys” of 1817-1821 are important historical predecessors to modern theories and representations of triadic transformational spaces.\(^10\)

The following section begins with a very brief exposition to the 19th century German ideas (both Riemannian and otherwise) which Lewin revisits in GMIT. I continue with a discussion of some of the thinking Lewin and other scholars pursued as they built NRT in recent decades and a description of the analytical issues NRT arose to address. I then explore some of the tools of modern NRT including some representations of pitch and harmonic space that have come to be mainstays of modern NRT.

**Riemannian Theories**

We are – perhaps unwittingly – most familiar with the work of Hugo Riemann via our now ubiquitous terms: tonic, subdominant, and dominant.\(^11\) Riemann's work on tonal functionality, culminating in his Vereinfachte Harmonielehre (in translation as Harmony Simplified, or the Theory of the Tonal Functions of Chords), is among the

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\(^10\) Cohn 1998a, 173. Schritte are relations between triads of the same mode (major or minor), while wechsel are relations between triads of opposite mode.

\(^11\) Hyer and Rehding, “Riemann, Hugo.”
sources that established the tonic-subdominant-dominant-tonic ur-progression as archetypical in modern discussions of tonal harmony. However, as mentioned previously, Riemann also worked with the quasi-algebraic system of Schritte and Wechsel operations. These Schritte and Wechsel are based on principles of harmonic dualism (i.e. acoustic generation of major and minor sonorities from the overtone and surmised undertone series). The strictly symmetrical dualistic thinking formalized the Schritte, which are mode-preserving triadic transposition operations, to transpose major and minor triads in opposite directions. Thus, the same Schritt that transposes C major to E-flat major also transposes C minor to A minor. The Wechsel are mode-reversing operations but operate in a similarly dualistic fashion. The Wechsel that relates C major to F minor, for instance, relates F minor back to C major (and also relates C minor to G major). Importantly, the Schritte and Wechsel make no stipulations in and of themselves for tonality. Riemann's ideas of tonal functionality and the system of Schritte and Wechsel are both prominent antecedents of the triadic transformational discourse that has blossomed in recent decades.

Neo-Riemannian Theories: Operations

TRIADIC TRANSFORMATIONS IN GMIT

In light of NRT's frequent preoccupations with music that is often said to resist tonal understanding, it is interesting that David Lewin's discussion of Riemannian ideas in GMIT begins by considering Riemannian harmonic function theories, which concern the familiar idea of assigning dominant, subdominant, mediant, etc. functionality to

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12 Rehding 2003, 38.
13 Klumpenhouwer (1994) concisely summarizes the implied group-theoretical character and potential for transformational interpretation within the Schritte and Wechsel system.
Klänge. This seems like an odd place to start especially considering the drive towards wide potentiality for application and great generality that heavily marks GMIT. Richard Cohn gives one appraisal of Riemann this way: “Although Riemannian functions make no appeal to a governing diatonic collection, they nonetheless classify triads in relation to governing tonic triads, and thus have limited application to triadic music that 'suspends tonal gravity.'”

Lewin, however, casts Riemann's tonal functions in a transformational light, interpreting operations DOM, SUBD, MED and SUMB (familiar from his work earlier in the decade) not “as labels for Klänge in a key, [but] rather [...] as labels for transformations that generate Klänge from a local tonic [...] or urge the Klänge of a key towards their tonics.” Again, we can detect Lewin's transformational attitude in this language, and his discussion of triadic operations is unified by this concept. Lewin continues his exploration by introducing the Leittonwechsel transformation, which derives not from Riemannian tonal function theory, but from the 19th century German Schritte and Wechsel system. The Leittonwechsel acts, for example, to transform C major into E minor, and E minor back into C major. Mathematically speaking, this is referred to as an involution, an operation that can serve as its own inverse and reverse itself when applied

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14 GMIT, 175-180.
15 Cohn 1999, 11.
16 GMIT, 177. Emphasis in the original. Lewin has been criticized for this reading of Riemann as a mere classifier of chords. Alphonce (1988) counters: “In Riemann's terminology the meaning of 'Funktion' may come closer to a relation than to a transformation, but to the best of my understanding it comprises the dual aspect of being derived from, and pointing back to, (in this case) the tonic” (171). While Lewin's stated understanding of Riemannian tonal functional designations as simply a substitute for Roman numerals may indeed be a misunderstanding, Lewin is unequivocal in his suggestive characterization of Riemann's tonal functional designations as active, transformational processes. The metaphor of motion is again evident; the triadic transformations are cast as operations by that we experience transit from triad to triad.
17 Klumpenhouwer (1994) explains the Schritte and Wechsel system in connection with Lewinian transformational techniques. Klumpenhouwer examines their group properties and their dualistic conceptual origins in addition to casting them as transformations. The Schritte and Wechsel have a particular kinship with modern NRT since they do not inherently carry any tonal implications and can model all of the moves between any two given triads.
in succession. Other involutionary transformations Lewin discusses are the *Parallel* transformation (*Quintwechsel* in Schritte and Wechsel nomenclature), which transforms between major and minor triads over the same root; the *Relative* transformation (*Terzwechsel*), which transforms any triad into its relative major or minor, and what he calls the *Slide* transformation (*Gegenterzwechsel*), which transforms C major into C# minor and vice-versa. In discussing the *Slide* transformation, which he considers one possibility among numerous other “more exotic operations on Klangs,” Lewin's suggestion is that any number of triadic operations could be defined in a similar manner.\(^\text{18}\)

In *GMIT*, Lewin introduces several *klang* transformations that draw eclectically and selectively from Riemann's tonal functional theories and the Schritte and Wechsel system.\(^\text{19}\) This variety is problematic. For one, tonal functional transformations carry, in the words of Daniel Harrison, a “freight that is costly to handle” in that they suggest centricity while other transformations Lewin describes do not.\(^\text{20}\) Moreover, although Cohn observes that Lewin severed “Riemannian triadic theory from its tonally centered origins,” the tonal status of such transformations remains unclear in practice.\(^\text{21}\) Prior to Cohn's statement, Lewin had productively used these Riemannian tonal functional transformations to model tonal attraction in his Beethoven analyses in *GMIT*.\(^\text{22}\) On the other hand, the Schritte and Wechsel family of transformations is large and unwieldy, and its nomenclature is based on the apocryphal concept of harmonic dualism. In short, *GMIT* offers suggestive ideas for systems of triadic transformations that could be useful in analyzing highly chromatic triadic music, but does not provide a comprehensive

\(^{18}\) *GMIT*, 178.

\(^{19}\) *GMIT*, 178.

\(^{20}\) Harrison 2004, 7.

\(^{21}\) Cohn 1996, 12.

\(^{22}\) Lewin's Beethoven analyses in *GMIT* include his discussions of the Menuet from the First Symphony (176), and the *Appassionata* sonata (213).
method for dealing with such analytical situations. Even eleven years after the publication of *GMIT*, Cohn reflects, “we are confronted with the remarkable circumstance that there exists no standard system for labeling the triadic transformations.”

**BRIEF EXCURSUS: WHAT'S IN A NAME?**

As Hook indicates, “[the] term neo-Riemannian is a recent coinage, first appearing in print in Cohn 1996.” According to Cohn, this work is *neo*-Riemannian for three reasons: first the specious dualistic concept is side-stepped since NRT treats consonant triads as *a priori* objects rather than basing them on acoustic generation; second, enharmonic equivalence and equal temperament are assumed (unlike in Riemann's thinking); third, modern NRT explicitly formalizes triadic transformations along the lines of algebraic transformations, which map triads to one another, and can be nicely merged with Lewin's transformational metaphors and transformational attitude. We can easily imagine a space populated with triads and a variety of moves that deliver us from one location to another in this space.

Cohn, however, has recently distanced himself from being labeled as a *neo*-Riemannian. For some such as Tymoczko, the designation uncomfortably implies a commitment to harmonic dualism. Furthermore, Rings indicates that although “*neo*-Riemannian” is an appropriate designation for formalizing and representing musical relationships and transformations, the term has also been misconstrued as a label for a

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23 Cohn 1998b, 289. This passage was brought to my attention by Hook 2002 (57).
25 Cohn 1996, 12.
26 Cohn 2011, xiii.
27 Tymoczko 2009. This was brought to my attention by Cohn 2011 (xiii).
certain kind of music.\textsuperscript{28} This risks falsely binarizing triadic music into “purely tonal” and “not tonally reconcilable” categories. Furthermore, the accompanying idea that transformational theory or NRT is only applicable to certain kinds of music is malformed and damagingly limits the purview of the theory.\textsuperscript{29} However, as Hook has remarked, NRT’s “application to standard diatonic progressions is awkward.” This awkwardness is problematic for the theory since diatonicism is far from absent even in the late 19\textsuperscript{th} century repertoires NRT most often engages with.\textsuperscript{30} Additionally, it is not yet clear how NRT might be sensitively applied to non-standard repertoires such as late Renaissance music.

\textit{A NOTE ON ORTHOGRAPHY}

Typically, NRT labels triads with capitalized roots and a + or – sign to indicate major and minor, respectively. This convention originates in \textit{GMIT} when Lewin specifies an ordered pair notation in his investigations of triadic transformations.\textsuperscript{31} \textit{GMIT} would label the C-major triad as (C, +) and the c-minor triad as (C, -). This ordered pair notation eventually became adapted into a visually simpler system of labels whereby C+ refers to a C-major triad and C- refers to a c-minor triad.\textsuperscript{32}

\textsuperscript{28} Rings 2011, 2.
\textsuperscript{29} Rings 2011, 2. Rings asserts, “[there] is nothing about transformational theory [or NRT] that makes it atonal in principle.”
\textsuperscript{30} Hook 2002, 59. Others might disagree that NRT fails in diatonic situations. Cohn (1996) ends by suggesting the applicability of NRT to tonal paradigms. Rings (2011) indicates that his 2006 dissertation began as “an effort to connect neo-Riemannian theory more fruitfully to traditional ideas about tonal music” (1).
\textsuperscript{31} \textit{GMIT}, 176.
\textsuperscript{32} Hyer 1995 retains Lewin's ordered pair notation, but Cohn 1996 adopts the root-sign (e.g. C+) notation that has by now become standard in NRT.
THE PLR GROUP

Although Lewin began his explorations of triadic transformations with a Riemannian tonal functional approach, the ensuing development of neo-Riemannian theory has focused primarily on the involutionary operations that bear more relation to the tonally agnostic Schritte and Wechsel system. Currently, neo-Riemannian analysts narrow the basic transformations to the parallel, leittonwechsel, and relative transformations. Parallel (P), leittonwechsel (L), and relative (R) and compounds thereof have been extensively implemented in the post-Lewinian neo-Riemannian discourse to discuss distinctive and “tonally indeterminate” triadic successions. These three particular transformations are treated as the basic operations of the theory because they all feature retention of two triadic tones, with movement occurring in only one voice in a step-wise fashion. The actions of these unary transformations upon C+ and C- are shown below in figure 2.2. Filled-in noteheads show common-tones and open noteheads show tones that move stepwise for each transformation.

Figure 2.2 Some examples of P, L and R transformations
As figure 2.2 shows, P transformations simply change the mode of any triad, retaining the perfect fifth dyad and altering the remaining pitch. The L transformation retains the minor-third dyad and alters the remaining pitch, transforming a major triad into the minor triad whose root lies a major-third above that of the major triad. It follows that L also transforms a minor triad into the major triad whose root lies a major-third below that of the minor triad. The R transformation retains the major-third dyad and alters the remaining pitch, transforming a major triad into the minor triad whose root lies a minor-third below that of the major triad. It follows that R also transforms a minor triad into the major triad whose root lies a minor-third above that of the minor triad. These unary transformations all feature retention of triadic pitches two pitches and serve as their own inverses. Applying R to C+ and then applying R to the result brings us back to C+. These basic transformations, which are all mode-reversing, can be compounded. The binary transformations, which feature a single common-tone between the triads they relate and are all mode-preserving, are shown below in figure 2.3.

Figure 2.3 Binary transformations compounded from P, L and R transformations
From these binary transformations, we can generalize about any of the compound transformations. Compound transformations can be thought of as successive applications of unary transformations. For instance, a PRL transformation applied to C+ can be conceived as follows: apply P to C-, then apply R to the result, and then apply L to the result of that. From this we can deduce that PRL transforms C+ into G-.

Compound transformations are generally not involutionary, and the inverse of any transformation can be obtained from performing the transformation backwards. Thus, only palindromic transformations (such as RLR, PLP, RPR, etc.) reverse themselves and are involutionary. Thus, as in figure 2.3, LP, for example reverses the actions of PL. A compound transformation composed from an odd number of unary transformations will be mode-reversing while a compound transformation composed from an even number of unary transformations will be mode-preserving. In total, 24 neo-Riemannian operators with distinct actions exist in equal temperament if we stipulate the inclusion of a “do nothing” identity transformation, sometimes labeled P0L0R0. We can thus assert an algebraic group of neo-Riemannian operators, hereafter the \( PLR \) group. The neo-Riemannian PLR group allows precise discussions of triadic motions in tonally ambiguous music since it makes no recourse to concepts of tonal centricity or diatony.

In triadic repertoires in which Roman numeral analysis or other harmonic tools run into difficulties (such as the late-nineteenth century music that the NRT discourse has favored), neo-Riemannian operators offer an efficient way in to the harmonic fabrics woven by such music.
PATH/GOAL DUALITY

Are algebraically compound PLR group operations definitionally compound in all senses? The issue is in no way universally agreed upon. Kopp, for instance, reads the PLR group compound transformations as definitionally compound, and proposes an alternate system of triadic transformations in which triadic moves are represented as distinct unary operations since “a unary transformation is preferable to model a unary process.” Indeed, it is often intuitive to say that the move from one triad to another is a single concerted action, an observation that perhaps is not adequately conveyed by the compound PLR group operations. According to Kopp, a PLR group transformation is defined by its transformational path more than its eventual goal or destination. Kopp implies that PLR group transformations may not be appropriate since their products must be calculated by applying P, L or R to triads in multi-step processes.

Hyer, however, argues that compound PLR group operations need not be understood as multiple basic transformations strung together. The LP transformation, for instance, “gains a certain conceptual independence from particular major (or minor) triads when it enters into an algebraic group, becoming a single, discrete transformation rather than a process that combines two more primitive transformations, L and P.” In a PL transformation, according to Hyer’s argument, “[P and L [...] fuse together transforming (E, +) into (C, +) without articulating an intervening (E, –): (E, +)(PL) = (C, +) rather than (E, +)(P) = (E, –) and (E, –)(L) = (C, +).” Though the LP and PL transformations are “spelled” using two basic transformations, they act algebraically as discrete transformational “words,” and need not be understood as two conjoined basic

33 Kopp 2002, 168n7.
35 Hyer 1995, 111.
transformations. By further analogy to written language, we do not ordinarily posit
differences between one-letter words and words containing multiple letters since words
of any length constitute single syntactical units of a certain kind. Likewise, compound
PLR group transformations can be understood as concerted processes that reflect unary
actions despite their compound “spellings.” Cohn has also come to treat compound PLR
group transformations as unitary gestalts that refer to single motions and happen to be
“spelled” with more than one basic transformation.36 Mathematically speaking, a
function (such as a musical transformation) is simply a mapping between sets. Neo-
Riemannian transformations are just functions that produce mappings between triads
and other triads (a mapping from a set to itself). While it may require several steps to
calculate the actions of a function upon some value, in the end, only a single mapping is
made. A single function that takes multiple steps for a person to calculate is formally
distinct from a set of simpler functions whose products are combined together, even if
the end results are the same. This thesis adopts the view that any triadic transformation
is a single function that maps triads to other triads, and understands triadic
transformations as unitary gestalts in the sense of Cohn above, as concerted processes
that may nonetheless take more than one step to calculate.

The path-goal duality issue also induces the question of whether or not
transformations that are “spelled” differently but yield identical triadic moves should be
regarded as equivalent. That is, does the transformation refer to the particular series of
transformational steps that provide transit from one triad to another, or is that motion

36 Cohn 2011, 30. Interestingly, Cohn 1997 treats the question of whether or not compound
transformations must necessarily be understood as multi-step processes as an open question. Cohn
2011 (30n13) comes down more firmly on the issue, remarking that “[although] there is heuristic value
in the compound name, there is no necessary significance to it. The same is true in natural language,
where words like breakfast and handicap autonomously accrue and shed meanings apart from their
compound [etymologies].”
itself the transformation? Like Kopp, Gollin argues that the compound operations of
the PLR group are definitionally compound. Gollin argues further that when faced with
a choice between two equivalent transformational processes, one might be preferable to
another. However, Gollin strongly advocates the understanding that “a transformation
between two musical 'things’ is the class of all pathways between those things – all the ways of getting
from one to the other – in a music-transformational space.” Gollin thus equates the
“transformation itself” with the particular musical move in question, and treats different
transformational pathways as referential to the same musical move. But Gollin's
argument that some transformational pathways are preferable to others even when they
refer to the same musical move remains a highly suggestive point. It may not always
suffice to treat different, equivalent transformational pathways such as LPLP and PL
(which can both refer to the move from Db+ to A+) as interchangeable and Gollin
categorizes LPLP and PL as distinct interpretations of the same transformation. Neo-
Riemannian analysts must therefore choose very deliberately whether or not to treat
equivalent PLR group operations as essentially the same and must be equally careful in
deciding whether or not they shall understand transformations to be defined by their
sources and destinations, or their pathways. This thesis adopts the understanding that
any particular transformation refers to a particular musical move rather than to the
specific transformational pathway it spells out and will not engage directly with probing
the interpretive multiplicities of alternate “spellings” of the same transformation.
However, I proceed with the caution that such tactics may not necessarily be appropriate
for all applications of NRT.

37 Gollin 2000, 36-37.
38 Gollin 2000, 89. Author's emphasis.
Neo-Riemannian Theories: Representations

A number of representations of triadic space have been developed by scholars working with NRT. This section will introduce a few such representations proposed within the neo-Riemannian discourse that have charted different aspects of the triadic world and the transformations that inhere within it.

TONNETZE, KLANG-NETZE

Various forms of the tonnetz (tone-network) have appeared widely in neo-Riemannian scholarship. Forms of the traditional two-dimensional tonnetz have a considerable history, dating back to the nineteenth century tone-lattices appearing in the work of Weber, Oettingen, Riemann and others.40 The modern adaptation of the two-dimensional tonnetz assumes equal temperament and enharmonic equivalence, resulting in a closed, cyclic map of triad space. The modern tonnetz is thus situated not on the infinite Cartesian plane of just-tuned nineteenth century tonnetze but on the surface of a torus (a donut). One example of a modern tonnetz is given in figure 2.4. Gollin summarizes the characteristics of the tonnetz, observing that pitches are coordinated horizontally along a perfect fifth axis and diagonally along a major third axis; pitches form triangular regions corresponding to triads; the edges of triangular regions correspond to the component intervals of triads; major and minor triads are visually represented as triangles of opposite orientation; common-tone retention between triads is visually manifest since triads that share a common edge share two pitches while triads that share a common vertex share one pitch.41 When the modern tonnetz is unfurled onto the flat, two-dimensional page, the result is typically displayed in the manner of

40 Cohn 1998a, 173.
41 Gollin 2000, 259.
Figure 2.4 A typical two-dimensional tonnetz of modern NRT

The tonnetz has proven to be a handy tool in charting common-tone retentive moves between triads, which can be visualized as a series of “flips” of triangles across the edges of the tonnetz or across triangular vertices. This tonnetz space offers a landscape over which paths featuring P, L, and R motions can be charted and have figured prominently in the work of Cohn and others. Tonnetze need not necessarily be constrained to 12-tone equal temperament and triads. Cohn and Lewin have shown how tonnetze can be generalized to other trichords and other chromatic cardinalities.

Instead of networking triadic pitches as in figure 2.4, triads themselves can themselves be networked, forming a \( klang-netz \) (network of consonant triads) as in figure 2.5 below.

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42 Gollin 2000, 259. Figure 2.4 is taken from Gollin’s figure 6.3.
43 Paths through tonnetz space have figured prominently in Cohn 1997 and Cohn 2011 especially. Capuzzo (2004) has explored tonnetz representations of pop-rock vamps.
44 Cohn 1997 and Lewin 1996, respectively.
adapted from Julian Hook's 2006 essay. This klang-netz replaces the lettered pitch names of figure 2.4 with numeric pitch-classes and superimposes triad names over the triangular regions of the tonnetz and shows that any given pitch-class is shared by six unique triads. Klang-netze need not necessarily indicate pitch-content explicitly in the manner of figure 2.4. Though the transformational lattice of figure 2.5 features P, L and R transformations, klang-netze are not limited to these transformations and can be coordinated using other transformations to provide transit between triads. Various other chord types can be networked in similar ways. Douthett and Steinbach, for example, explore network representations of various species of seventh-chords.

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45 Figure 2.5 is taken directly from Hook 2006. This sort of klang-netz is identical to the “chicken-wire torus” in figure 7 of Douthett and Steinbach 1998.
46 Gollin (2000) explores numerous klang-netze organized with transformations other than P, L and R.
47 Douthett and Steinbach 1998.
HEXATONIC AND OCTATONIC SPACES

The tonnetz of figure 2.4 and the klang-netz of figure 2.5 develop spaces organized by $P$, $L$ and $R$ transformations. A space could also be organized using only the $P$ and $L$ transformations. This tactic produces four triad cycles, commonly called
Hexatonic cycles since any given cycle of P and L transformations employs the pitches of a hexatonic scale: the highly symmetrical set class 6-20, commonly called the augmented scale. The four possible hexatonic cycles (H₀, H₁, H₂, and H₃) cover all 24 major and minor triads and have been collectively called the hyper-hexatonic system shown in figure 2.6, taken from figure 5 of Richard Cohn’s 1996 article.⁴⁸

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⁴⁸ Cohn 1996, 24, figure 5.
As figure 2.6 shows, any two neighboring hexatonic cycles share the pcs of an augmented triad while diametrically opposed hexatonic cycles do not have any pcs in common. In Cohn's terminology, these cycles are maximally smooth; adjacent triads within any single hexatonic cycle require only single semitone displacements.\(^49\) One of the salient features of hexatonic cycles is that they feature triadic root motion by major thirds. Such harmonic moves, which can sometimes be difficult to reconcile with purely tonal analysis, figure prominently in the sound worlds of numerous nineteenth century composers.\(^50\) Cohn’s analysis of the first movement of Schubert’s D. 960 examines how the moves within the maximally smooth voice-leading spaces of hexatonic cycles intersect with more traditional tonic-dominant motions.\(^51\)

As Rings points out, “[harmonies] closely related in voice-leading space may nevertheless be distantly related in tonal or harmonic space.”\(^52\) Hexatonic cycles coordinate triads with regards only to maximally smooth voice-leading and relate triads that can be juxtaposed in profoundly striking ways. Cohn has recently explored the hermeneutic and semantic significances of the hexatonic-pole transformation (PLP), which directs transit in either direction between any two triads that are diametrically opposed in a hexatonic cycle (such as E- and C+ in \(H_0\) of figure 2.6).\(^53\) Hexatonic poles are modal opposites and their roots lie a major third apart. Cohn associates this piquant harmonic move with qualities of uncanniness, strangeness, liminality and even death, investigating how this triadic juxtaposition and its semantic connotations have colored

\(^{49}\) Cohn 1996, 15. As Douthett and Steinbach (1998) and Cohn (2000) demonstrate, from a voice-leading perspective, the shared augmented triad between hexatonic triad cycles acts can behave as a voice-leading intermediary between them, facilitating “modulations” between them. For example, the C augmented triad mediates between \(H_0\) and \(H_1\) as shown in figure 2.6.

\(^{50}\) Cohn 1996, 15.

\(^{51}\) Cohn 1999.

\(^{52}\) Rings 2006b, 42. This reference was brought to my attention by Ramirez 2009 (234).

\(^{53}\) Cohn 2004 and Cohn 2006.
the expressive fabric of pieces by composers as diverse as Gesualdo, Monteverdi, Haydn, Schubert, Wagner, Puccini, Ravel, Sibelius and Schoenberg.

Cycles can also be organized via P and R transformations and can be coordinated in a manner analogous to Cohn’s hyper-hexatonic system. The three triad cycles formed using P and R transformations are octatonic cycles, shown in figure 2.7 below as a hyper-octatonic system.\textsuperscript{54} Each octatonic cycle \((O_0, O_1, O_2)\) contains the pcs of the familiar

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure27.png}
\caption{The hyper-octatonic system}
\end{figure}

\textsuperscript{54} This figure is adapted from Ramirez 2009 (215, figure 4.5).
octatonic scale, and neighboring octatonic cycles share the pcs of a fully diminished seventh chord. Octatonic cycles feature root motion by minor thirds. Diametrically opposed triads of any given octatonic cycle have been termed octatonic poles by analogy to Cohn’s hexatonic poles. The triadic octatonic pole transformation (RPRP, equivalently PRPR) relates two triads of the same mode whose roots lie apart at the distance of a tritone. Scott Murphy has identified associations of octatonic pole transformations relating two major triads with attributes of distance, ambiguity and unfamiliarity in some recent film music. Triadic near-octatonic poles, RPR or PRP transformations, like hexatonic poles and triadic octatonic poles, feature no common tone retention. RPR labels a transformation in either direction between two triads of opposite mode whose roots lie a tritone apart while PRP labels a transformation in either direction between a major triad and the minor triad whose root lies a minor third above that of the major triad. Triadic near-octatonic poles are also aurally potent triadic relations.

TRANSFORMATIONS AND VISUAL REPRESENTATIONS

The visual representations of triadic transformational spaces introduced here are but a small sampling of the spaces scholars have developed. As Hook notes, one of the main interests of scholars working with transformational theories, especially neo-

55 As in footnote 46 above, the diminished seventh chord and its subset diminished triads shared between two octatonic triad cycles can act as voice-leading intermediaries that facilitate “modulation” between octatonic triad cycles.
56 Ramirez 2009.
57 I use the term triadic octatonic pole here since the term octatonic pole has also been used to label the relation between a half-diminished seventh chord and the dominant seventh chord whose root lies a minor third below that of the half-diminished seventh, as in Childs 1998 and Cohn 2011, 155-156.
58 Murphy 2006. Murphy calls this triadic move the major tritone progression.
59 Douthett and Steinbach (1998) develop numerous other chord spaces that feature common-tone retention and small voice-leading.
Riemannian theories, has been the exploration of musical spaces and the construction of accessible visual representations to guide those explorations. Spitzer writes that the task of conceptualizing musical spaces is inextricably bound with the task of charting pathways by which to navigate through this landscape. Path metaphors and metaphors of motion central to Lewin’s transformational attitude continue to inform the representations used in neo-Riemannian analysis and the transformational work that has developed from the neo-Riemannian discourse.

**Neo-Riemannian Theories: Onwards**

As Rings reflects, the burgeoning of NRT and its “turn towards algebraic models of harmonic process represents one of the most remarkable discursive shifts in the discipline [of music theory] in recent years.” Its rapid rise to prominence and the unusually collaborative early years of its development (in the pages of JMT 42/2 for example) have led it into an adolescence. NRT has recently given way to a number of other related explorations of chordal space and voice-leading that seek broader disciplinary connections with atonal theories. In another direction, a growing body of recent work has also begun to probe the intersections between NRT and Schenkerian theory. Additionally, scholars have recently sought to develop hermeneutic applications of NRT and transformational theories in addition to extending and sophisticating prior models. New repertoires continue to fall under the gaze of scholars interested in neo-

60 Hook 2006, 50.
61 Spitzer 2003, 103.
63 See Tymoczko 2011, Callender 2004, Straus 2003, Hook 2002 and Morris 1998 to name just a few. This work often extends thinking influenced by NRT to great generality, and sometimes departs significantly from traditional NRT.
64 Some examples of this work include Goldenberg 2007, Hunt 2007b, Jones 2007 and Rings 2007.
65 Gollin (2000) and Lehman (2011), for example, merge neo-Riemannian transformational theory with
Riemannian models. As Roeder and Cook suggest, pop-music, music of the early Baroque and certain twentieth century repertoires including minimalist music suggest promising applications of NRT.\textsuperscript{66} NRT has even begun making its way into undergraduate curricula and its resources are far from having been exhaustively inventoried and investigated.\textsuperscript{67}

\textsuperscript{66} Roeder and Cook 2006, 43.

\textsuperscript{67} On this, see Engebretson 2007.
CHAPTER 3

SOME TRANSFORMATIONS OF PITCH TRANSFORMATIONS

Introduction

The next two chapters introduce a thought experiment that inquires into how transformations themselves might act as objects that can be transformed. Transformational theory has often been characterized as a departure from traditional music theory. According to this characterization, traditional theories are often concerned with objects, derivations, forms, congruences, etc., while transformational theories are concerned with the relationships between musical objects, i.e. how we get to and from these objects via processes that relate them. Traditional music theory might then be likened to geometry since both share a concern with various states of being. By this analogy, transformational theory, due to its concern with processes of becoming, the ways by which “things” are changed into one another, might then be likened to calculus. But calculus also provides powerful tools to examine how motions between points change from motion to motion, how patterns of change are altered. Thus, I seek to make an exploratory foray into how transformational spaces might be constructed in which groups of transformations provide the musical objects that occupy the spaces. As such, familiar transformations can be considered objects that can themselves be transformed into and amongst one another. Such an idea is in no way foreign to the algebra upon which transformational theory is typically formalized. Algebraic functions and transformations can act upon other functions or transformations as well as other more

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1 In an interview published in the Harvard Crimson, Frank Lehman poses this analogy. “Traditional music theory attends to things in music as if they were objects: chords, intervals, lines. Transformation analysis takes an alternate path by looking at changes and movement rather than objects. Not at points, but at linear transformation. Calculus, not geometry.” (Bannatyne 2011)
basic families of objects.

This idea was inspired by some ideas from GMIT, with Lewin's analytical rendering of a passage from the *Scolica Enchiriadis* to which the words “Nos qui vivimus” (“We who live”) are set. The principal voice is doubled below at the symphony (i.e., consonant interval) of the diatesseron (three gamut steps) by the organal voice. To coordinate the vertical and melodic intervals, Lewin creates a network of networks reproduced here as figure 3.1.

![Figure 3.1 Lewin's network of networks for “Nos qui vivimus”](image)

A small corpus of work on transformational models discussing transformations-of-transformations as such has been done by David Lewin and Graham Hunt, though their approaches are quite different from the one sketched here. By analogy to Lewin's network-of-networks, I intend to make an exploratory foray into models for

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2 The *Scolica Enchiriadis*, as its name suggests, is the companion volume to the more famous ninth century *Musica Enchiriadis*. These anonymous treatises contain the earliest known discussions of organum and transmit the first examples of chant in determinate and precise notation for pitch. Erickson, “Musica Enchiriadis, Scolica Enchiriadis.”

3 *GMIT*, 205.

4 Lewin (1992) explores how the neo-Riemannian transformational structure of the Valhalla motif is converted into the Tarnhelm motif. However, Lewin does not explore how transformations are transformed into other transformations, but instead examines how applying neo-Riemannian transformations selectively to the harmonies of the Valhalla leitmotif converts it into the Tarnhelm leitmotif. Hunt (2007a) explores how characteristic neo-Riemannian transformations change as the Wagnerian leitmotifs he examines undergo changes as they appear in diatonic vs. chromatic environments. This idea of transformations being transformed by changing the environments in which they are invoked has conceptual affinity with the interscalar transformations and cross-type transformations formalized in Hook 2007a. There are related ideas in Tymoczko 2011 and Gollin 2000.
Transforming Pitch-Transpositions: Stretching and Shrinking

Consider a group of pitch-transpositions that act upon the space of equally-tempered pitch classes. A very important stipulation here is that we are now considering pitch transpositions (not pitch-class transpositions) outside of the context of octave equivalence. Thus we are imagining an infinite group in which leaps from pitch to pitch shall be considered unique if their absolute magnitudes (the intervals that span them) are different. Here, a descent by perfect fifth shall be distinguished from a descent by perfect twelfth. Though only some members of this group will ever be musically relevant, if desired, we certainly could conceive of a transposition of any possible magnitude in either direction. We are thus imagining a infinite pitch-space and an infinite group of pitch-transpositions with a lower bound (the smallest pitch-transposition would be T₀, but no absolute largest pitch-transformation could be specified).

To imagine how members of this group of pitch-transpositions might be transformed, we need to populate a space with them, imagining them as objects like pitch-classes or triads. Taking the infinite, lower-bounded group of pitch-transpositions as the basic objects of this formalism, we can imagine transformations that act upon this group, stretching or shrinking individual pitch-transformations in size, enlarging or diminishing their magnitudes. We can then formalize a family of stretching and shrinking transformations that shall be written as \( \text{TRANS}^+n \), with \( n \) being any real number.

More formally speaking, the index \( n \) alters the absolute value of the transpositional subscript. This stipulation says that if \( n \) is negative, it models a
contraction or shrinking of some particular pitch-transposition. Conversely, if \( n \) is positive, it models an expansion of some particular pitch-transposition. When \( \text{TRANS}^+ n \) is applied to some pitch-transformation, the functional statement thus reads as follows: “this pitch-TRANSposition is altered in size by \( n \) semitones to yield the pitch-TRANSposition whose subscript's absolute value is \( n \) greater than that of the original.” A necessary condition for the smooth and simple working of \( \text{TRANS}^+ n \) operators as formalized here is that the pitch-transpositions they act on must reflect directionality.\(^5\) That is, within the group of pitch-transformations, negative integers furnish subscripts for pitch-transpositions that project downward pitch-motion, and positive integers furnish subscripts for pitch-transpositions that model ascending pitch-motion. Thus, \( \text{TRANS}^+ n \) models stretching a pitch-transposition, and \( \text{TRANS}^{-} n \) (i.e. \( \text{TRANS}^+ (-n) \)), models shrinking a pitch-transposition. Figure 3.2 demonstrates below with various examples of \( \text{TRANS}^+ 5 \) and \( \text{TRANS}^{-} 5 \) transformations. Notice here that the \( \text{TRANS}^+ n \) transformations and associated pitch-transpositions operate free of mod-12 logic and convey directionality. \( \text{TRANS}^+ 5 \) enlarges upward and downward projecting leaps of seven semitones into upward and downward projecting leaps of twelve semitones, respectively. Conversely, \( \text{TRANS}^{-} 5 \) compresses upward and downward projecting leaps of twelve semitones into upward and downward projecting leaps of seven semitones, respectively.

\(^5\) This notion of directionality agrees with ideas developed by Tymoczko (2009), who asserts that one weakness of the mod-12 pc-transposition group \( T_0 \) through \( T_{11} \) is that it does not model differences between ascents and descents very well. But as Rings notes (2011, 14), we are indeed free to invest appropriate transformations with notions of directionality, for example differentiating \( T_7 \) from \( T_{-7} \).
Figure 3.2 TRANS+5 (stretching) and TRANS-5 (shrinking) transformations of pitch-transpositions

While the TRANS+n transformations are conceptually related to the idea of group closure (the idea that combining two transformations of a group is equivalent to some other transformation in said group), there are important conceptual differences. TRANS+n transformations do not model the act of combining two pitch-transpositions together into one compound. Rather, they model the idea that some characteristic pitch-transposition gesture might occur repeatedly in a composition without appearing identically each time, nonetheless remaining recognizable as the gesture in question. The gesture's absolute magnitude grows or shrinks, yet it retains its musical identity in some manner. In no sense is this pitch-transposition being conjoined with another to result in a two-unit pitch-transposition gesture. Instead, the characteristic transposition gesture grows or shrinks, dilates or constricts in mathematically describable and potentially musically/programmatically relevant ways.

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6 Closely-related thinking is often modeled with contour theory, e.g. Marvin 1988, Morris 1993, and Quinn 1997. However, I depart from contour theory since it asserts similarity classes between similar pitch motions at the expense of attending to differences between them. For example, basic contour theory would describe C4-D4-C4 followed C2-D6-C2 as an up-down motion followed by another. The present theory of transformations of pitch-transpositions would say that the component moves of C4-D4-C4 have grown and expanded to result in the much more drastic C2-D6-C2.
The TRANS+n transformations do not form a group. They form a family of transformations called a monoid: a group-like entity without inverses that can nonetheless enable musically useful transformational statements. Why do the TRANS+n transformations fail to satisfy the inverse property of algebraic groups? One reason is because inverses are impossible to specify when a TRANS+n transformation shrinks some pitch-transposition to T₀. For example, TRANS-1 shrinks both T₁ and T⁻₁ into T₀. Upon arrival at T₀ if all we know is that a TRANS-1 shrinking transformation got us there, where did we start: T₁ or T⁻₁? It is impossible to tell, and therefore not every TRANS+n transformation has a well-defined inverse.

**Vignette: Back to Schoenberg Op. 19 No. 6**

To begin exploring a theory of transformations of pitch-transpositions, I will first examine how this concept can be grafted onto a conceptually prior transformational analysis of more traditional objects and more traditional transformations. Making room for transformations-of-transformations in appropriate contexts can add further gestural, kinetic insights to a transformational analysis. Consider again Lewin's brief analysis of the falling minor-ninth gesture in Schoenberg’s op. 19 no. 6. Recall that there was some degree of gymnastics involved in fitting the relevant pitch events into the falling minor-ninth understanding.

Specifically, the first and third of these falling minor-ninths had certain problems. Understanding the first falling minor-ninth in mm. 3 - 4 as such involved a counter-intuitive process by which a minor-ninth passing from left-hand e-natural to right-hand d-sharp 13 half-steps below was asserted even though the left-hand does in fact
complete a motion to the d-sharp a semitone below its e-natural. There is a sense in which Lewin’s analysis cuts across a segmentation that would group the left-hand and right hand actions separately. Principles of auditory stream segregation as theorized by Albert Bregman and others hold that pitches “close together in frequency should become part of the same stream.” While Bregman makes allowances for the idea that it is possible to perceive relationships that cut between different auditory streams, there is a certain logic in Schoenberg’s score that favors a cognitive segregation of right-hand and left-hand actions in mm. 3 - 4. Because of the registral separation of the actions of both hands (which are notated on separate L.H. and R.H. staves) and the hyperbolic contrast between R.H.’s piano and L.H.’s pianissississimo dynamic markings, the score could easily lead one to assert that the left and right-hand actions segregate into two perceptual and cognitive streams for a reader/performer of the score, a possibility that Lewin’s analysis dispenses with in order to maintain its assertion of the falling minor-ninth gesture.

By an alternate logic, shown in the annotated score of figure 3.3, the falling semitone in the left-hand could take perceptual priority over Lewin’s falling minor-ninth in mm. 3-4. Asserting a falling semitone at mm. 3-4 is also justified by the realities of performing the piece. To play the left-hand d-sharp at the tremendously soft dynamic level indicated in the score is quite difficult. From my performative perspective, I reflect that I must invest considerable attention to the pianissississimo d-sharp my left hand executes following the high e-natural in order to ensure that all notes speak. In this sense, the right-hand d-sharp a minor-ninth below the high e-natural is a secondary priority since so much of my effort is devoted to executing the pianissississimo d-sharp.

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7 A non-annotated score for the piece is reproduced on p. 18 of this thesis.
8 Bregman and Pinker 1978, 22. As Bregman points out, his experiments in auditory stream analysis draw on earlier work by Gestalt theorists and the even earlier work of Helmholtz.
Figure 3.3 Annotated score of Schoenberg’s op. 19 no.6 with falling gestures labeled
Continuing, the second falling minor-ninth is indeed a falling minor-ninth but the third and final falling-minor ninth gesture is in fact a falling minor-sixteenth, a fact that Lewin acknowledges but downplays. However, as the preceding discussion shows, the falling gesture can alternately be understood as expanding in magnitude from a falling semitone at mm. 3 - 4, to the falling minor-ninth of mm. 4 - 5, to the falling minor-sixteenth of m. 7. In this understanding, the characteristic downward gesture grows an octave larger each time it appears. This reframes Lewin's characteristic falling minor-ninth as a growing, falling semitone-equivalent gesture (T₁, stretched by TRANS+12 transformations) that can be modeled by the simple network of figure 3.4a. Recall here that the TRANS+n transformations act mathematically upon the absolute values of the transpositional subscripts of the pitch-transpositions they transform. Thus, T₁ is stretched by TRANS+12 into T₁₁₃, which is then stretched by TRANS+12 into T₁₂₅. The ideas sketched in figure 3.4a work in tandem with Lewin's own observation that the transpositional development of the three falling gestures (as in figure 3.4b) matches and linearizes the intervallic structure of the opening right-hand <B, F♯, A> trichord (as in figure 3.4c). The networks of figure 3.4 have been constructed to look similar and have the same graph structure (positioning of nodes and arrows), and the claims of figure 3.4a add to Lewin's observations modeled in figures 3.4b and 3.4c, though it is conceptually quite distinct. Ultimately, figure 3.3a seeks to provide further support for Lewin's interpretive remark that “‘forwards in time’ and ‘downwards in space’ are phenomena that work together in many ways over the course of the piece.”

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9 Again, see Lewin's figure 7.1 in GMIT 159, reproduced on p. 16 of this essay.
10 GMIT, 160.
As Lewin explains, “the three transposition-operations $T_5$, $T_9$, and $T_{14}$, which move the falling [semitone] forwards in time over figure [3.4b], are exactly those [transformations] which move the individual pitches of rh downwards in space, as shown on figure [3.4c].” If we allow ourselves to understand Lewin’s characteristic pitch-transformation gesture as a mutable entity instead of forcing it into a falling minor-ninth procrustean bed at each of its appearances, we can then model the enlargement of the gesture with the network of figure 3.4a, which shows that as the falling gesture is developed forwards in time, it projects increasingly downward. It is more of a fall each

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11 GMIT, 160.
successive time it appears, falling by one octave more each time.

The progressive enlargement of the falling semitonal gesture via the TRANS+12 transformations shown in figure 3.4a indeed shows how Schoenberg develops ideas about falls and the act of falling in this composition. As Elaine Barkin's graphic, free-associative interpretation of this piece corroborates, descending motions figure prominently in the experience of op. 19 no. 6. In an intuitive and embodied sense, we understand that the greater a fall, the harder the landing will be. Regarding the three falling semitonal gestures as progressively greater falls is consistent with Schoenberg's markings. Figure 3.3 shows that the first falling semitone in mm. 3-4 is marked with a decrescendo. The falling minor-ninth at mm. 4-5 does not indicate any dynamic change, but the falling minor-sixteenth at m. 7 is marked with a crescendo. As these semitone-equivalent falls increase in magnitude, their “landings” are marked with greater force and impulse. Expanding the falling semitone of mm. 3-4 by TRANS+12 transformations thus allows us to layer our intuitions regarding the mechanics of falling bodies onto our understanding of aspects of the pitch structure in op. 19 no. 6. Thus, the transformations-of-transformations in figure 3.4a serve as adjuncts to Lewin's own transformational observations in order to demonstrate further ways in which his interpretive remarks about the piece's downward registral thrust moving forward in time are musically relevant.

One should not conclude that Lewin's hearings in figures 3.4b and 3.4c are invalidated or somehow replaced by those in 3.4a. In reality, it is more appropriate to say that we intuit aspects of all three networks as we hear or play the piece since the three networks pursue different objectives. Constructing a group of transformations that acts

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12 Barkin 1979. Lewin (1986, 383n33) discusses Barkin's interpretation of Schoenberg's op. 19 no. 6 as both an analytical meditation and a creative, poetic reflection upon prior artwork.
upon pitch-transformations is pursued here simply to more adequately model and communicate a hearing that attends to how characteristic gestures change in magnitude as they occur again and again in a piece of music, retaining their musical roles in suggestive ways even as their properties shift.

To echo Lewin's 1977 article, it is the “moves” across certain intervals/distances (heuristically labeled as pitch transformations above) that leave the strongest psychomotor and aural imprint on me as both performer and listener. As the piece progresses forward in time, the falling-semitone gesture becomes increasingly salient over its three occurrences. I observe that while I recognize all of these “moves” as musically related (since they are equivalent in modulo the octave), there is a highly palpable sense in which the gesture dilates as the piece moves forward. If I were to sit at the piano fumbling through the piece blindfolded, some of my first reflections would indeed concern going about accurately performing these descending semitonal moves, which become increasingly difficult execute with precision as they expand in size, observations I make first on a purely psychomotor basis in the manner of Lewin's 1977 article. These observations corroborate Lewin's remark that the piece tends to move downward in pitch-space as it moves ahead in time, and they cooperate with his original analysis in a way that seeks to be more sensitive to the gesturality of this gem-like, atonal miniature.¹³

¹³ As Rings (2011, 53) implies, there are phenomenological differences between the three semitonal gestures (T₁₁, T₁₃ and T₂₅) examined in this revisionist analysis, though traditional mod-12 post-tonal theory would not distinguish between them. This reading seeks to attend to how we simultaneously experience both change and sameness as we successively hear the three falling gestures in the manner originally described by Lewin’s analytical remarks on this piece.
Vignette: Motivic Transformations in Ravel’s Scarbo

To demonstrate how transformations of pitch-transpositions can model our musical intuitions of motivic change and their interactions with text, I examine various appearances of what I, for ease of reference, call the “Scarbo motif” in the final piece in Ravel's 1909 suite for piano, Gaspard de la Nuit. This motif, one of but a few out of which Ravel spins the fabric of Scarbo, recurs numerous times throughout the music and is associated with the presence and motion of the titular character. To generalize about the occurrences of the Scarbo motif, it consists of a characteristic initial ascending semitone $T_1$ (mod-12) followed by another ascent of some magnitude $T_n$ as shown below. Its internal intervallic structure is not consistent across all its appearances due to its mutable second interval. Its first interval, always an ascending semitone (or mod-12 equivalent gesture), establishes the identity of the three-note motive. Modeling the changes the Scarbo motif undergoes as it appears over the course of the piece as transformations of transformations captures some important elements of the aural and psychomotor experiences of listener and performer, respectively. Furthermore, focusing on the growth and contraction of characteristic pitch transformations foregrounds how
the music enacts some aspects of Aloysius Bertrand's poem, shown in figure 3.6 with the epigraph Ravel chose for it.

**SCARBO**

He looked under the bed, in the fireplace, in the chest; - nobody. He could not understand where he had entered or where he had escaped.

E.T.A HOFFMANN. - *Nachtstücke.*

Oh, how often I have heard and seen Scarbo when at midnight the moon shines in the sky like a silver shield on an azure banner semé of golden bees!

How often I have heard his laughter booming in the shadow of my alcove, and his nails grating on the silk of my bed curtains!

How often I have seen him come down from the ceiling, pirouette on one foot and roll around the room like the spindle that has fallen from a witch's distaff?

Did I at such times think he had vanished? Then the dwarf would grow bigger between the moon and me like the bell tower of a Gothic cathedral, a round golden bell shaking on his pointed cap!

But soon his body would become blue, diaphanous as the wax of a taper; his face would become pale as the wax of a candle end – and suddenly he would be extinguished.

**Figure 3.6 Scarbo, poem by Aloysius Bertrand, epigraph by Hoffmann**

As Leong and Korevaar observe in their analysis of this piece, “[the] dwarf Scarbo is a fantastic and faintly malevolent being, unexpectedly appearing and disappearing, rapidly changing in size and color, constantly active and full of motion.”

Scarbo's bodily and physical states are described as unstable, constantly in flux. Ravel signifies this through the numerous forms the Scarbo motif takes over the course of the piece. Over the course of the piece, Scarbo appears again and again, signified by the characteristic semitonal ascent followed by another ascent of an unfixed, unpredictable

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14 Leong and Korevaar 2011, 125.
magnitude. Additionally, the Scarbo motif's transpositional magnitude may indeed reflect
more than his physical size; it may also reflect the magnitude of the character's presence
within the narrator's consciousness. By this understanding, the transpositional
magnitudes of the Scarbo motif statements can be heard to allegorize some physical and
psychological apperceptions of the dwarf's magnitude as viewed from the first-person
perspective of the poem. Some appearances of the figure labeled with the measures in
which they appear are shown in figure 3.7 with their component gestures identified as
pitch-transpositions. The great economy of Ravel's thematic materials in this piece
necessitates the use of and elaboration upon salient fragments such as the Scarbo motif
in a variety of ways and settings, the full extent of which is hardly captured by the
extracted Scarbo forms of figure 3.7. These have been removed from their musical
environments to quite an extent in order to lay bare their intervallic (gestural,
transformational) similarities. However, the fact that Ravel's compositional procedure
creates variety and interest through constant manipulation of the Scarbo motif over the
course of the piece squares nicely with the idea of Scarbo as a highly mutable being.

Figure 3.7 demonstrates that Scarbo motif forms consist of two transpositional gestures:
an initial ascent of semitonal character (either an ascending semitone or ascending
minor-ninth in the case of m. 581) followed by another upward leap. We can therefore
model all of the initial semitonal ascents as homologous transpositions and all of the
subsequent ascents (of various magnitudes) as homologues as well.
Figure 3.7 Some Scarbo motifs and their component gestures represented as pitch-transpositions
A network representation of the Scarbo motifs as they appear over the course of the piece is shown in figure 3.8. Unlike a network that takes pitch-classes as basic objects, this one does not indicate the identities of the pitches that participate in the piece's Scarbo motif forms. Instead, it takes the homologous gestures involved in each Scarbo motif form as its basic objects and opts to focus (à la Lewin 1977 once more) on the various “moves” that are played by the pianist or intuited by the listener as signifiers of the character. Just as Scarbo's capricious shape-shifting is revealed in Bertrand's poem (“Then the dwarf would grow bigger between the moon and me like the bell tower of a Gothic Cathedral”), it is also enacted by the expansions and contractions of the homologous transpositions that comprise each Scarbo motif. Thus, the network asks us to attend to the growth and shrinkage of the moves by which Scarbo is represented, highlighting some psychomotor aspects of how the Scarbo motif changes as the piece moves forward in time.

Figure 3.8 The development of Scarbo motif forms analyzed with transformations of pitch-transpositions
One technical aspect of the network in figure 3.8 is the fact that, like in the network of figure 3.4a, modulo-12 math does not inhere within its nodes. This better captures some of the gestural information in the piece. For example, the ascending minor ninth of the first gesture in the Scarbo form at m. 581 is represented as a $T_{13}$ gesture in order to reflect how it differs from all the other Scarbo forms of figures 3.7 and 3.8. However, based on our implicit familiarity with mod-12 logic, we easily recognize $T_1$ and $T_{13}$ as very similar entities, both gestures are ascents with semitonal aural qualities. The semitonal ascent is a marker of the Scarbo motif and is crucial for the recognition of each Scarbo form as such. On the other hand, absolute magnitudes of the expansions and contractions of moves comprising the various Scarbo forms are given without recourse to mod-12 logic in order to best capture the full gestural changes by which the physical states of Scarbo can be heard to shift. Phenomenologically speaking, the ascending semitone and ascending minor-ninth, while harmonically similar, and quite different in gestural terms.

Most importantly, the transformations that drive the network in figure 3.8 interact meaningfully with the text. The expansions and contractions of the gestures of the Scarbo motif over the chronology of figure 3.8 mirror the supernatural shape-shifting tendencies of the poem's subject, as previously mentioned. Furthermore, while a “literal correspondence between the sequential events in the poem and those of the music” cannot always be demonstrated,\textsuperscript{15} one meaningful instance of literal correspondence is reflected in figure 3.8. The expansion of the Scarbo motif and its component gestures to

\textsuperscript{15} Leong and Korevaar 2011, 125. \textit{Gaspard de la Nuit} can thus be suggestively construed as a musical poem about a literary poem, a meta-poem of sorts rather than a literal translation. As such, it is an example of musical \textit{ekphrasis} (in the sense of Bruhn 2000), a musical interpretation of an artwork in a different medium by which aspects of the original are more vividly communicated to the audience via the musical rendering.
the fearsome registral expanse of its mm. 581 appearance enacts the poem’s indication that “the dwarf would grow bigger...” While we understand that Scarbo mercurially changes his physical form repeatedly, the explicit mention of this quality in the penultimate stanza of the poem has its counterpart in the most drastic registral enlargement of the Scarbo motif in its penultimate appearance in the music. In both musical and poetic realms, Scarbo's growth and shrinkage are dynamic processes that we can model with the stretching and shrinking $\text{TRANS}^n$ transformations, applying them to the component pitch-transpositions of the Scarbo motifs that recur throughout the piece. The formalism sketched here aims to keep that dynamism intact as it applies a rigorous transformational toolkit to the music.

**Transformations of Transformations, Hermeneutics**

Thinking of how characteristic moves between basic musical objects (here, pitches) might change over the course of repetition implies broadening the horizons of object selection and the attendant task of operation attribution, one of Frank Lehman’s sites of hermeneutic opportunity in transformational analysis.\(^\text{16}\) Also formalized in Tymoczko’s work, albeit quite differently, treating certain moves or actions as basic objects in themselves and attending to how they are altered by specific transformations marks a departure from much of the transformational theory literature. This discourse has typically focused on how pitch-classes, pitch-collections, harmonies, etc. are transformed by the very moves and actions that serve as the basic objects upon which

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\(^{16}\) Lehman 2011. Lehman specifies four sites of hermeneutic opportunity in transformational analysis: operation attribution, network design, assignment of harmonic hierarchy and affirmation or dismissal of transformational continuity.
the transformations sketched in this and the next chapter act.\textsuperscript{17} Ultimately, this thinking is highly consistent with the original methodological position articulated in GMIT, which outlines a focus not on the traditional objects of musical analysis but on the relations between them. To seek ways to discuss changes to salient relations when they recur, treating them as transformational objects, is merely an extension of the Lewin’s attention to the connections between points in musical space, rather than the points themselves.

But my goals here are twofold. I wish to suggest extensions to transformational models, but also to investigate their usefulness for generating interpretive statements about music. In the Schoenberg op. 19 no. 6 analysis, TRANS+ transformations helped to develop an interpretation of the piece that connected aspects of it with embodied, sensory knowledge of falling. In the Scarbo analysis, they helped to investigate the music’s portrayal of a poetic text’s title character. More broadly speaking, although a rigorous hermeneutics of transformational analysis has yet to be fully codified, transformations (and transformations of transformations) can be fruitfully deployed to deepen musical and/or textual understanding.\textsuperscript{18} Lehman argues, “Lewinian transformation theory was first, and still should be, about enriching our knowledge and experience of actual music.”\textsuperscript{19} Even as we come up with new extensions to the formalisms of transformational theory, it seems that its disciplinary relevance stands only to be bolstered by further probing its usefulness to interpretation and musical hermeneutics.

\textsuperscript{17} Tymoczko 2011. Tymoczko rigorously formalizes ways of producing changes to some particular voice-leading by individually transposing the triads that participate in it by different amounts to produce another similar yet non-identical voice-leading. This treats particular voice-leadings (transformations) as basic objects that can be transformed into and amongst one another. Thus, both Tymoczko and I argue for discursive space in which concepts of transformations of transformations can reside.

\textsuperscript{18} Lehman 2011 argues these same points. Lehman also points out that transformational theory has been merged with interpretive, hermeneutic activity only sporadically in the work of Lewin, Gollin, Rings and just a few others.

\textsuperscript{19} Lehman 2011.
SO, WHY TRANSFORMATIONS OF TRANSFORMATIONS?

Why indeed. I hope to have suggested some utility of the core concept, how musical moves (i.e. transformations) change. However, the question remains: why discuss transformations of transformations? The language is unwieldy; why not discuss transformations of intervals instead? One reason to discuss transformations of transformations as such is to remain within a discursive tradition that seeks to regard musical relationships as active processes. While transformations of intervals could suffice from a formal perspective for the musical explorations in this chapter, the term interval does not lend itself to the embodied, active, gestural connotations as readily as the term transformation. However, the choice of transformation-language over interval-language in this chapter is not a decision of tremendous formal importance and was made largely for its connotations of dynamism. To reiterate Lewin, musical situations like the ones in this chapter do not formally necessitate choosing either interval-language or transformation-language since we can regard both as referential to the same musical phenomena. But transformational thinking is also broader than intervallic thinking and can model musical situations in which the concept of the interval is not quite appropriate. While intervallic statements can readily translate into transformational ones, the reverse is not necessarily true. Triadic relations, for example, do not necessarily lend themselves to being understood in simple intervallic terms. Ways by which such non-intervallic triadic transformations can be changed (i.e. transformed) into each other shall be the focus of the next chapter.

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20 GMIT, 160.
21 GMIT, 180.
CHAPTER 4

SOME TRANSFORMATIONS OF TRIADIC

TRANSFORMATIONS

Introduction

We can also conceive of transformations that transform the group of 24 unary and compound neo-Riemannian PLR-group operators into and amongst one another. An intervallic understanding of triadic relations can be awkward. It is rather more natural to discuss triadic relations as characteristic moves from triad to triad (i.e. triadic transformations). Consider the task of specifying intervals between C+ and E– and between C+ and E+. Certainly, the root intervals are the same in both cases, but C+ to E– involves a change in mode. C+ to E+ involves no mode reversal, but neither triad can be housed in the same diatonic collection. C+ to E– can be regarded as an L transformation, more parsimonious than the LP transformation of C+ to E+. By another perspective, C+ can be transformed into E+ in a single stroke via a T4 transposition, while C+ must be transformed into E– via a T4 transposition followed by inversion about the G/G# dyad. Which triadic relation is more “distant”? It is not entirely clear; intervallic thinking runs into complications when we consider relations between triads.1 However, once we choose a system of transformations (here the PLR group), we can quite simply think of the relations between C+ and E– and between C+ and E+ as transformations. In this chapter's analysis of a Gesualdo motet, we will see

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1 Once we structure a transformational space of, say, triads and triadic transformations, we are in fact free to regard the transformations within that space as abstract intervals within that space, as discussed in Hyer 1995. However, it seems that transformational understandings of triadic relations within such a space are conceptually prior to intervallic understandings since abstract intervals must be generated from the transformations that structure the space.
that characteristic triadic gestures will repeat over identical bass motions, albeit with harmonic alterations. The formalism proposed in this chapter examines those alterations as transformations of triadic transformations.

Edward Gollin's dissertation also outlines a method of transforming triadic transformational structures into others. Gollin's formalism relates networks of triadic transformations through algebraic automorphisms. Gollin explains that “[the] automorphisms act not on the musical elements of [triadic] spaces, but on the generators (and by extension all group elements) that organize those spaces.”2 That is, his automorphic transformations act not on triads but on the transformations by which spaces such as the modern tonnetz are organized. Gollin deploys his transformations of triadic transformations as allegories for Cinderella's transformations in Prokofiev's Cinderella, op.87.3 Gollin asserts two triadic transformation spaces: one for music depicting Cinderella as the shunned stepsister, and one for music depicting the glamorous Cinderella, who is the belle of the ball. Gollin's hermeneutic reading proposes that the transformation that transforms one space into the other is a music-theoretical fairy godmother. Just as Cinderella's fairy godmother permits her to pass between two narrative and social realms, a transformation of triadic transformations defines the passage between two transformational spaces in Gollin's analysis.

As in Gollin's Prokofiev analysis, my (very different) formalism for transformations of triadic transformations aims ultimately to access and attend to important aspects of the music-text relations in the Gesualdo motet. I again pose the previous chapter's overarching question: how can the inquiry into the mathematically describable structures deepen and shape our understanding of the semantic ones?

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2 Gollin 2000, 301.
3 Gollin 2000, 312.
Isographic Networks of Triadic Transformations Organized by Shortest Path Root Interval

As mentioned, this chapter's Gesualdo motet analysis involves observing that various triadic motions recur in non-identical fashion, though they are voiced over identical root motions in the bass. For example, we will see that a motion from E+ to G– is transformed into a motion from B– to D–. These two moves have identical root-motions and they are voiced identically. Furthermore, they are set to identical text. However, the first of these moves is clearly mode-reversing, while the second is a mode-preserving move between two minor triads. Gollin's formalism for transforming triadic transformations does not provide a way to efficiently relate mode-preserving and mode-reversing transformations such as the two aforementioned very similar triadic moves, which also set identical words of the motet text. I propose organizing spaces of triadic transformations by grouping them according to the interval classes spanned by their roots. This tactic organizes seven isographic networks of triadic transformation gestalts, each coordinating all the triadic transformations whose root motions are of the same interval class. To this end, it is useful to first tabulate all the possible triadic moves and their most efficient PLR-group designations as below in figure 4.1.
<table>
<thead>
<tr>
<th>ic Between Triad Roots</th>
<th>Action of Transformation</th>
<th>Shortest PLR Representation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>C+ to C+, C– to C–</td>
<td>(P⁺L⁺R⁺) (i.e. No change)</td>
</tr>
<tr>
<td></td>
<td>C+ to C–, C– to C+</td>
<td>P</td>
</tr>
<tr>
<td>1</td>
<td>C+ to Db+, C– to B–</td>
<td>LPRP=PLRL=RLPL=RPPL</td>
</tr>
<tr>
<td></td>
<td>C+ to Db–, C– to B+</td>
<td>LPR=LPL</td>
</tr>
<tr>
<td></td>
<td>C– to Db+, C+ to B–</td>
<td>LRL</td>
</tr>
<tr>
<td></td>
<td>C– to Db–, C+ to B+</td>
<td>PRPL=PRLP=IPLR=PLPR</td>
</tr>
<tr>
<td>2</td>
<td>C+ to D+, C– to Bb–</td>
<td>LRLR=RIলRP=RPRI</td>
</tr>
<tr>
<td></td>
<td>C+ to D–, C– to Bb+</td>
<td>RLR</td>
</tr>
<tr>
<td></td>
<td>C– to D+, C+ to Bb–</td>
<td>LRPR=LRPRP=PLRLR=PLRP=PRPR=PLRPL=PLPR=PRPRL=PRPRL=PRPRPL=PRPRPL=PRPRPRL=PRPRLP</td>
</tr>
<tr>
<td></td>
<td>C– to D–, C+ to Bb+</td>
<td>LRPR=PLPLR=RLRL</td>
</tr>
<tr>
<td>3</td>
<td>C+ to Eb+, C– to A–</td>
<td>PR</td>
</tr>
<tr>
<td></td>
<td>C+ to Eb–, C– to A+</td>
<td>PRP</td>
</tr>
<tr>
<td></td>
<td>C– to Eb+, C+ to A–</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td>C– to Eb–, C+ to A+</td>
<td>RP</td>
</tr>
<tr>
<td>4</td>
<td>C+ to E+, C– to Ab–</td>
<td>LP</td>
</tr>
<tr>
<td></td>
<td>C+ to E–, C– to Ab+</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>C– to E+, C+ to Ab–</td>
<td>LPL=PLP</td>
</tr>
<tr>
<td></td>
<td>C– to E–, C+ to Ab+</td>
<td>PL</td>
</tr>
<tr>
<td>5</td>
<td>C+ to F+, C– to G–</td>
<td>RL</td>
</tr>
<tr>
<td></td>
<td>C+ to F–, C– to G+</td>
<td>PLR=RLP</td>
</tr>
<tr>
<td></td>
<td>C– to F+, C+ to G–</td>
<td>LPR=PRP</td>
</tr>
<tr>
<td></td>
<td>C– to F–, C+ to G+</td>
<td>LR</td>
</tr>
<tr>
<td>6</td>
<td>C+ to F#+, C– to Gb–</td>
<td>PRPR=PRP</td>
</tr>
<tr>
<td></td>
<td>C+ to F#–, C– to Gb+</td>
<td>RPR</td>
</tr>
</tbody>
</table>

Figure 4.1 Exhaustive PLR-Group tabulation of the 24 Possible Triadic Transformations

Information in this table is taken from the extremely informative table in Hook 2002 (80), which also includes additional information such as the Schritte/Wechsel, and UTT designations for each triadic move, as well as designations from other nomenclatures. I have corrected here the few very minor typos I noticed in Hook 2002.
This table points out a number of features of neo-Riemannian PLR-group triadic transformations. First, every unique PLR-group transformation refers to two triadic actions, which proceed in opposite directions when the transformation is applied to major vs. minor triads. Moves with the same root-interval and root-motion direction may either be mode-preserving or mode-reversing. Adding a P transformation to either the beginning or end of a mode-preserving PLR transformation is equivalent to transforming it into one of the mode-reversing transformations with the same root interval. Additionally, when a P transformation is added to both the beginning and end of any given transformation the result is equivalent to both a move in the opposite direction that preserves the sequential order of triad modes and a move in the same direction that switches the modes of the triads involved. For example, adding P transformations to both beginning and end of the PRP transformation produces an R transformation (PPRPP=R). A given instance of a PRP transformation might refer to the move from C+ to Eb−. It can then be transformed into an R transformation, which could refer to both a move in the opposite direction like the one from C+ to A− or a move like the one from C− to Eb+, which proceeds in the same direction as our original PRP transformation. This second sense in which PRP is transformed into an R transformation seems to have the greatest import for examining non-exact musical repetitions. Exploring how characteristic triadic moves recur with the same harmonic directionality and root-interval but altered voice-leading properties will be important in the Gesualdo motet analysis later in this chapter.

The above observations allow us to form the isographic transformational networks of figure 4.2 a-c below, in which nodes specify some of the most commonly discussed PLR-group transformations. These networks relate R, L and RL
transformations to the other PLR-group transformations whose triad roots span the same interval class. Arrows specify transformations of triadic transformations that are equivalent to adding P transformations to either the beginning and/or end of a given node's PLR transformation.

Figure 4.2 a) Transformations between ic 3 root motion PLR transformations

Key

**Horizontal/Vertical Arrows:** traveling along this path yields a change equivalent to adding P transformations to both beginning and end (e.g. L transformation becomes PLP transformation)

**Curved Arrows:** traveling along this path yields a change equivalent to adding P transformation to beginning only (e.g. R transformation becomes PR transformation)

**Straight Diagonal Arrows:** traveling along this path yields a change equivalent to adding P transformation to end only (e.g. L transformation becomes LP transformation)
These networks systematize ways that PLR-group triadic transformations can be transformed into other PLR-group triadic transformations. One point that must be stressed is that when a PLR transformation is transformed by the operations embedded in the network structure, it is not being compounded with one or more P transformations. The idea here is simply that some gestalt, capable of being expressed by one or more PLR-group transformations, is being transformed into another gestalt.
capable of being expressed as another PLR-group transformation. This is why multiple PLR designations for the same triadic move or gestalt have been included in appropriate instances. Equivalent PLR operations (such as LPR and RPL) should not themselves be individually and separately hypostatized, but should instead be thought of as different names or heuristical stand-ins for particular triadic behaviors, in keeping with the perspectives on path/goal duality outlined in chapter 2.

Thinking of how particular moves between triads might change as they repeat implies broadening (with respect to neo-Riemannian analysis) the horizons of object selection and the attendant task of operation attribution, again, one of Frank Lehman’s sites of hermeneutic opportunity in transformational analysis. Additionally, it is important to point out that transformations of transformations, since they examine instances of transformations repeated in non-exact fashion in a piece of music, reflect on memory and recognition of musical structures. Transformations of transformations seek to model the thinking that occurs when we notice that a particular transformational gesture has occurred earlier in the music. We recall the gesture from its earlier appearance in the music, taking note that it has been altered in some way, that it has been transformed into a familiar yet somehow different gesture. Cognition of familiarity and difference is one of the most basic and important types of intuitions we can have about a piece of music and is pervasive in our music thinking. Transformations of transformations are simply a tool to help model certain our experiences of nearly-identical musical structures as they repeatedly occur in music.

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5 This characterization of a neo-Riemannian PLR transformation as a gestalt is taken from Cohn 2011 (30). It seems that Cohn introduces the term specifically to discuss gestalts of voice-leading behaviors.

6 Lehman, Frank. 2011. Lehman specifies four sites of hermeneutic opportunity in transformational analysis: operation attribution, network design, assignment of harmonic hierarchy and affirmation or dismissal of transformational continuity.
On Presentism

As Richard Cohn acknowledges, some level of “anachronistic retrofitting” is required to adapt transformational theory’s “mathematical techniques of inquiry and communication” to the repertoires of the nineteenth century. Cohn finds reasons to problematize the application of neo-Riemannian transformational theories to nineteenth century music even though this repertoire generated many of the questions NRT seeks to shed light onto and is often thought of as the “home repertoire” of NRT. In light of this, addressing issues of anachronism is all the more urgent in the following transformational analysis of Gesualdo’s motet. For one, it is problematic to assume a priori that a triadic approach to pretonal music is even appropriate to this music, though Gesualdo’s late style sits at the cusp of the Baroque. Among the central historicist warnings to modern theoretical appraisals of music of this time period is that it was conceived linearly under the system of modes rather than chordally. However, as Susan McClary’s study on the hermeneutics of modal organization in sixteenth century madrigals shows, Gesualdo’s modalities are ambiguous and not necessarily easy to discern. Furthermore, though McClary differentiates her approach from Glenn Watkins’ more harmony-oriented approach, she still invokes triadic and tonal concepts (such as tonicizations) and discusses verticalities as chords, rather than as epiphenomena of contrapuntal configurations.

Watkins rather sharply frames the idea that modality is “an all-encompassing

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7 Cohn 1998a, 176.
8 Palisca 1963.
9 McClary 2004. Watkins (2010) phrases the difficulty of understanding Gesualdo from the modal perspective rather more pointedly: “Ultimately, however, in the course of observing the madrigal’s transition from [Arcadelt] to Monteverdi, recent attempts at applying a neomodal paradigm for the history of the form have hit a brick wall when it comes to Gesualdo” (283).
10 McClary 2004.
factor in late-Renaissance music” as a fiction. While this may be an overly polemical characterization, Watkins is not alone in contending that traditional contrapuntal and modal conceptions of sixteenth century repertoires could use adjuncts. According to Palisca’s defense of Lowinsky’s *Tonality and Atonality in Sixteenth-Century Music*, “objective analysis reveals strong non-modal tendencies that certain [contemporary] theorists were happy to overlook.” Earlier in the same review, Palisca writes:

> It is usually a good rule to deal with the music of a period in terms of the theoretical concepts common to the musicians of the time.

However, students of 16th-century music have probably followed [some of] the theorists too blindly into the mists of pseudo-antiquarian modality. Sixteenth-century composers and writers failed to provide an adequate theoretical framework because they were uncertain of their own relationship to the tradition of modality.

The question of how exactly to approach the music that directly preceded the Baroque still remains unsettled. But citing Lowinsky, Palisca and Dahlhaus, Watkins makes a persuasive point: “that some of our most musical thinkers, many of whom were thoroughly conversant with the contrapuntal techniques of the Renaissance, have felt

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11 Watkins 2010, 282. For a sixteenth-century perspective, Watkins also cites Vincenzo Galilei who distanced himself from more traditional viewpoints such as those of Zarlino. According to Palisca’s *Grove* entry on Galilei, he favored “the new major and minor keys over the church modes, which he deplored as a false system.”

12 Palisca 1963, 82. Lowinsky’s 1961 monograph, reviewed by Palisca in JAMS, was particularly contentious in its time, as Watkins (2010) notes. Palisca acknowledges that “the [historicism] charge has been and will probably continue to be made against this book that it employs a terminology and conceptual framework that are foreign to the 16th century. The terms tonality, atonality, tonic, subdominant, dominant, and a modern system of chord-numbers are generously used.”

13 Palisca 1963, 82.
obliged to draw attention to later harmonic perspectives in evaluating Gesualdo's music should give us pause.”¹⁴

At least in certain instances, a triadic, vertical orientation to the musical surface could be warranted and fruitful as in the analytical work of Watkins and others. Gesualdo's late style observes a roughly categorical distinction between triadic homophony and linearity. This becomes abundantly clear in the striking juxtapositions of sections of homophony next to sections of florid imitative counterpoint that characterize his oeuvre. According to Benito Rivera, “several treatises from [the fifteenth and sixteenth centuries] imply not only a theoretical understanding of triadic construction, but, in fact, also a triadic orientation to polyphonic composition.”¹⁵ Among the most concrete and emphatic contemporary formulations regarding the triadic understanding particularly of late sixteenth century music is the 1612 Synopsis Musicae Novae of Johannes Lippius.¹⁶ Lippius points out that triads are complete harmonies, musical objects in and of themselves that can be major (“more natural, more perfect, more noble, and more pleasing”) or minor (“rather imperfect and mollis”); which can enjoy primacy by being in what is now called root position (“when its basis lies in the lowest position with the others above it”); which can appear in simple form or “diffused form,” in which “notes are spread out to different octaves,” and may be “enlarged” to contain doublings, with preference for doubling roots.¹⁷ Additionally, Lippius

¹⁴ Watkins 2010, 283.
¹⁵ Rivera 1979, 81. Rivera does, however, go on to caution that “The handful of forward-looking treatises […] constitute a minority in theoretical literature.” Nonetheless, Rivera continues, “their very existence is sufficient proof of an underlying current of harmonic innovation which we know eventually achieved recognition in the course of history” (95).
¹⁶ Lippius published his treatise the very year after Gesualdo’s sixth book of madrigals is published.
¹⁷ Lippius 1612, 41-42. Lippius' arithmetical derivation of the minor triad from inversion of the major however, supposes a basis in harmonic ratios based on principles of what would later become known as harmonic dualism (a concept familiar from Riemann’s work, though I do not wish to bring teleology to bear in this connection).
demonstrates a preference for recognizing triadic construction over the bass voice, rather than a more traditional discant-tenor structure. Rivera argues that this position of primacy for the bass voice, evident in the Gesualdo motet featured in this chapter, developed over the course of the sixteenth century in tandem with “the establishment of the triad to a position of prominence.” Rivera then speculates that the attention to triadic concepts in works such as Lippius’ Synopsis Musicae Novae is symptomatic of an increasing desire to account for the verticalities in contemporary polyphonic music.

The work of Lippius suggests a point similar to one Watkins makes, that “any claim that ‘counterpoint’ (the linear [and modal]) in Gesualdo’s music was antonymous to ‘harmonic’ (the vertical) must be held as misleading. Ultimately we come to the realization that to emphasize Gesualdo’s contrapuntal foundation at the expense of the harmonic outcome is as impossible as the opposite contention.” Rivera cautiously contends that “whether Renaissance musicians had already been intuitively practicing what Lippius was now putting into words is a question that has been argued in many scholarly debates,” one which has no simple or obvious answer, though Lippius makes explicit mention of the motets of Orlando de Lassus and the madrigals of Luca Marenzio as examples of music displaying triadic organization. Lippius’ remarks seem most valuable as suggestions that apprehending the music of Gesualdo’s immediate predecessors and contemporaries through a triadic lens might not have been entirely

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18 Lippius 1612, 48. This procedure, which demonstrates a structural primacy for the bassus, does not negate the importance of the discantus and tenor dyad pair, but instead supplants its previous role as an “elaboration of the discant-tenor progression” (Rivera 1979, 84). Lippius indicates that the composer can continue after determining the bass “with the ruling melody of the tenor or discant and add the remaining voices.”
19 Rivera 1979, 84. Rivera (1978) has also explored the 1581 Isagoge of Johannes Avianius, in which an early triadic theory is formulated.
20 Rivera 1979, 81.
21 Watkins 2010, 278.
22 Rivera 1984, 63-64.
NRT's emphasis on the voice-leading connections between triads has the potential to touch on both harmonic and linear concerns. Unlike a more Rameauian Roman numeral approach, NRT highlights the horizontal capabilities of triads in addition to recognizing their vertical structure. Furthermore, while Hook cites insensitivity to triad roots and to hierarchical distinctions as problems of NRT, but these qualities may indeed confer a benefit to the present analytical application. As Cohn contends, roots do not necessarily have or deserve privileged status in transformational theories, and we cannot take them for granted in a neo-Riemannian analysis. The neo-Riemannian approach brings with it a greater responsibility than usual to specify triadic voicings very carefully and critically, a crucial condition for a sensitive harmonic discussion of a repertoire for which an analysis undertaken solely in terms of the chordal roots is at best historically insensitive and potentially quite spurious. Moreover, since NRT makes no assumptions regarding structural hierarchy, it is well suited to the task of investigating significant details that reside only at the musical surface. While a hierarchical approach runs the risk of eliding such details from the analysis in the search for deeper structures, NRT affords the analytical opportunity to retain those details and

23 It is important to consider theoretical treatises not just as instructive texts which informed compositional practice, but also as products of their time – reflections on contemporary compositions. It seems unlikely that Gesualdo would have been deeply influenced by emergent triadic theories, nor could Lippius’ 1612 treatise have been part of Gesualdo’s library during his years of active composition. However, it is conceivable that Lippius was responding to compositional thinking that was already being put into practice by composers that influenced Gesualdo, as Rivera (1984) suggests. It is at least possible that Gesualdo and his contemporaries were thinking of triads some of the time as they composed. The oft-cited Prologue to the Prophetiae Sibyllarum of Orlando de Lassus and its heavy preponderance of root position triads strikingly suggests that composers of the late sixteenth century began thinking explicitly of the triadic sound as a discrete compositional resource.

24 Bashour 1979, 152. Bashour remarks that Rameau's system was incomplete due to its insensitivity to the linear actions of triads. Bashour points out that Schenker's approach sought to combat this weakness. The neo-Riemannian approach also emphasizes linear actions of triadic voices.

25 Cohn 2011, 41.
mine them for semantic significance.

Neo-Riemannian transformations will be deployed mostly in explicit connection with triads rooted over the notes of the lowest voice. These triadic events must be distinguished from other ones in which, for example, a root-position triad is followed by a six-four chord. To avoid veering too far in a *basse fondamentale* direction, I will avoid collapsing the distinction between these two categories, although either type of move might be semantically charged and efficiently captured by a neo-Riemannian transformation label. Furthermore, NRT can help to avoid a potential weakness Schenkerian or Roman numeral analyses might easily suffer from: the teleological view that sixteenth century chromatic music harbors a mannered, incomprehensible or weakly-formed tonality. Schenkerian and Roman numeral-based approaches also introduce implications of tonal unity and key areas that may not necessarily be appropriate to late sixteenth and early seventeenth-century chromatic repertoires. Neo-Riemannian transformations make no assumptions about hierarchical tonal unity or key areas. They serve simply as labels for moves amongst triadic sounds, names for particular motions or gestalts with certain voice-leading and common-tone retention properties. In the sense of Cohn, they are “a bridge to a first approximation,” and are meant to provide a way to discern some of the triadic patterns encountered in the piece. Cohn remarks elsewhere, “voice leading models can make contributions to interpretation. But they do not constitute interpretation in and of themselves.” I apply the highly precise PLR-group transformation labels to triadic events in my Gesualdo motet analysis with the

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26 In this connection, see Salzer 1952, 262. Salzer directs his Schenkerian gaze to the Orlando de Lassus motet *Christe Dei Saboles,* and is immediately frustrated. Without attempting a Schenkerian reduction, he concludes: “[this] author readily concedes his inability to understand this music.”

27 Cohn 2011, xiii.

28 Cohn 2011, 112.
goal of performing thicker interpretive work. I assert that the triadic events of the motet are invested with expressive and hermeneutic significance, due especially to the text.

While this study aims to suggest a cautious extension of the purview of NRT into late sixteenth and early seventh-century chromaticism, in no way does this analysis claim to solve the problems involved in the analysis of this repertoire, nor do I propose NRT as a panacea for the numerous methodological challenges it presents to modern day analysts. However, via this neo-Riemannian approach I hope to sidestep a few issues, namely what Kyle Adams refers to as “the Procrustean bed of major/minor tonality” and assumptions of musical incoherence that have been persistent hurdles for scholars who aim to sensitively discuss harmony in this repertoire.29 We now turn to this chapter's analytical reading of the Gesualdo motet and its text. Though the tools employed here are decidedly etic, ultimately, the goal is to address one of the most emic questions of all: how does the music enact the text?30

A Hermeneutic Exercise: Transformations and Affect in a Gesualdo Motet

(1) O vos omnes qui transitis per viam  
(2) attendite et videte  
(3) si est dolor  
(4) sic ut dolor meus [...]  

Lamentations 1:12 (excerpt)

The above (as given in the Latin Vulgate Bible and the Douay-Rheims English

29 Adams 2009, 258.
30 The idea behind the Lewinian verbiage of music “enacting” text is phrased this way by Lippius: “Just as the oration should mirror the subject matter, so also the harmonic piece should mirror the oration together with the subject matter” (Lippius 1612, 43). The following neo-Riemannian analysis aims to delve deeply into music-text relationships unlike Siciliano 2005 and passages of Cohn 2011. Both of these works discuss Schubert songs without significantly engaging music-text relations.
translation) is an excerpt from one of a small group of single verses from the book of Lamentations, which were commonly given motet-like settings during the later years of the Renaissance.\textsuperscript{31} These motets were meant particularly to be sung during Holy Week services in commemoration of the Passion.\textsuperscript{32} This liturgical usage of Lamentations texts was incredibly persistent. Polyphonic settings of the Lamentations for the \textit{Tenebrae Offices} of Maundy Thursday, Good Friday and Holy Saturday boast a continuous history spanning from the fifteenth century to the early nineteenth, with a brief resurgence in the mid-twentieth century.\textsuperscript{33} Gesualdo's five-voice \textit{O Vos Omnes} (on which he based a later six-voice responsory for the tenebrae of Holy Saturday) from his \textit{Sacrae Cantiones} of 1603 sets the fragment of Lamentations 1:12 that appears above.\textsuperscript{34}

\textit{OLD TESTAMENT TEXT...}

The Book of Lamentations is the prophet Jeremiah's expression of grief in five poems, mourning the drawn-out devastation of Jerusalem at the hands of Nebuchadnezzar's invading Babylonian armies in 586 BCE. As Elizabeth Boase explains, “the destruction of the city followed a protracted two year siege, with the armies surrounding the city and restricting the flow of food and water into Jerusalem. Famine

\begin{footnotes}
\item[31] I chose the Douay-Rheims translation (over the King James Bible) not only for its more literal correspondence with the structure and syntax of the Latin Vulgate, but also because it was assembled during Gesualdo's lifetime and because it is a \textit{Catholic} Bible. The Counter-Reformational spirit upheld in this translation resonates with the sacred polyphony of Gesualdo and contemporaries such as Marenzio, who has been called the “official musician of the Counter-Reformation” (Bizzarini 2003, 323). All English language biblical excerpts will be taken from the Douay-Rheims Bible unless otherwise indicated.

\item[32] Massenkeil, “Lamentations.”

\item[33] Caldwell, “Tenebrae.”

\item[34] Lamentations 1:12 in full reads (from the Latin Vulgate Bible): “O vos omnes qui transitis per viam, attendite, et videte si est dolor sicut dolor meus: quoniam vindemiavit me ut locutus est Dominus in die iræ furoris sui.”

In translation (from the Douay-Rheims Bible): “O all ye that pass by the way, attend, and see if there be any sorrow like to my sorrow: for he hath made a vintage of me, as the Lord spoke in the day of his fierce anger.”
\end{footnotes}
spread, and death was rife.”

This was an event of profound significance for the Israelites not only because of the sheer amount of suffering that occurred but also because Nebuchadnezzar’s armies razed the Temple of Jerusalem (see Jeremiah 52) and forced the people of the city into exile away from their homeland. Thus, the invading armies dealt severe blows of physical/material and spiritual/cultural natures.

Jeremiah personifies the stricken city as a destitute widow, crying out in anguish. This fictional persona is woven into Jeremiah's narration (ostensibly reflecting his own sorrow over the sacking of Jerusalem) and she introduces a highly personal and visceral tone to Jeremiah's otherwise historical and theological commentary. The author makes very clear both through his own narration and through the voice of his personified Jerusalem that the suffering evident in the Book of Lamentations results from an act of divine judgment. Furthermore, the widow of Lamentations 1 experiences the dolor of her situation in self-awareness and contrition, and we sense that her physical pains are compounded by spiritual ones. Not only does her state of destitution and suffering torment her; she bears a heavy burden in the form of awareness of the sin and iniquity that have led to her situation. Jeremiah's widow speaks Lamentations 1:12 near the beginning of an extended soliloquy, which continues to the end of the chapter. In the fragment of the verse that Gesualdo sets, her monologue engages multiple personae, not only her own.

She addresses herself explicitly to the passers-by in lines 1 and 2, capturing the attention of her external observers. Imploring them to direct their consciousness to her outcry, she then urges them to make a comparison in lines 3 and 4 between the suffering external to her experience and her own personal anguish. “Truly pay attention,” she asks,

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35 Boase 2005, 1.
“and see if there is any suffering (in the rest of the world) that can match mine.” It is clearly understood that the comparison she invites her audience to make between herself and all others can have but one conclusion. This *rhetorical comparison*, nearly hyperbolic in its insistence that the speaker's agony is the most profound pain anywhere to be found, serves singularly to isolate and alienate the speaker from all others within a realm of suffering that she uniquely inhabits. Anguish, grief and torment thus reside solely with this personified Jerusalem of Lamentations 1. If there be sorrow (“*si est dolor*”) external to her experience of suffering, it pales in comparison. Thus, lines 1, 2 and 4 direct the observers' consciousness *towards* the widow and her emotional states, while line 3 directs contemplation *away* from her subjectivity to that of the *indefinite other* – everybody else's (comparatively meager) sorrows, anyone else's (comparatively shallow) suffering. Lines 1, 2 and 4 refer to a subjectivity marked by intense pain, taking on similar emotional valences, while line 3 is unburdened by these affective associations.

… *NEW TESTAMENT CONTEXT*

Like many of the texts set for use during Holy Week services, Lamentations 1:12 is, of course, an Old Testament verse. This fact is unremarkable *in se*, but it has interesting implications for textual interpretation. The association of *O Vos Omnes* music with the events of the Passion encourages us to imagine the speaker not primarily as the personified city of Jerusalem but, more likely, as the suffering Christ, upon whose crucifixion the observance of Holy Week hinges. Indeed, given the image of the suffering Christ that would have figured prominently in the consciousness of attendees of Holy Week services, a correspondence between the affective content of the *O Vos Omnes* text and Christ's subjectivity as portrayed in the Gospels is easy to discern. It is
not unreasonable to entertain speculation that such a reading of Lamentations motivated its use within the context of the Passion. Consequently, as a setting of *O Vos Omnes* is performed, the audience or congregation is addressed by both the fictional widow of Jeremiah's poem and (more prominently) by the suffering Christ of the Passion story. More precisely, within the liturgical context that occasions *O Vos Omnes* motets, the widow of Lamentations serves as a mouthpiece for an affective state imagined to belong to the Christ of the Passion story.

**LINE 1: ADDRESS**

![Figure 4.3 Score reduction of line 1](image)

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36 This connection between the Book of Lamentations and the biography of Christ may have additional biblical precedent. Moffitt 2006 argues that the Gospel of Matthew, which is believed to have been written after the second destruction of Jerusalem in 70 CE, makes numerous textual allusions to passages from Lamentations, and suggests that Matthew “is, like so many of the prophets before him, calling his kinsfolk to repent” just as Jeremiah did centuries before in the aftermath of the first destruction of Jerusalem. Moffitt suggests plausibly that *Lamentations* would have been a significant part of the collective consciousness of Matthew’s community as they reeled from the Roman siege that destroyed the temple. Indeed, making a connection between the first and second destructions of Jerusalem would have been well-within reason for future writers. The Rabbinical *Targum* for Lamentations 1:19, for example, makes explicit reference to Roman Emperors Vespasian and Titus, who presided over the destruction of Jerusalem in 70 CE.

Christian theology holds that the Gospels indicate that Jesus prophesied the second destruction of the temple as in Matthew 24:1-2: “And Jesus being come out of the temple, went away. And his disciples came to shew him the buildings of the temple. And he answering, said to them: Do you see all these things? Amen I say to you there shall not be left here a stone upon a stone that shall not be destroyed.” These verses explicitly connect the 70 CE Siege of Jerusalem with the story of Christ. Could an association between the life of Christ and the Roman siege on Jerusalem in 70 CE have prompted church musicians to make a further connection between Christ's life, the Roman siege of 70 CE and Nebuchadnezzar's siege decried in Lamentations? In any case, the resonances between passages of Lamentations and the subjectivity of the suffering Christ suggest the plausibility of such an intertextual linkage quite.
Befitting the attention-grabbing motives of line 1, the music to which it is set is harmonically striking and strongly declarative, drawing the listener's attention to itself just as the text's speaker calls attention to himself/herself. A reduction of line 1 appears above in figure 4.3 and full score of the motet can be found at the conclusion of this chapter. Beginning on an unassuming C+, our speaker cries out to anyone who will listen, addressing the passers-by collectively (“O vos,” mm. 1-2). A chromatically charged move brings us to the repeated A+ sonorities of mm. 3-5. The speaker again identifies and calls out to the addressee (“O vos omnes,” mm. 3-5), extending and elaborating the address of mm. 1-2. We can already sense the isolation and separateness the speaker imputes to his/her subjectivity. The textual repetition-extension over A+, the destination of a striking harmonic move from C+, calls attention to the multiplicity of the plural “you” (“vos”) that the speaker addresses. The rhetorical emphasis placed on “O vos omnes” distances the speaker from addressees, highlighting a binary opposition between the self of the speaker's perspective and those perspectives outside of that self. Indeed, this particular repetition is not characteristic of O Vos Omnes motets as whole, and does not occur in the O Vos Omnes motets of other well-known Tenebrae such as the ones written by Victoria, Palestrina and Asola.

Line 1 continues to completion, making another chromatically charged descent from A+ to F+, coming to a repose on D+ by way of an interpolated phrygian cadence. One of the important features of the homophony here is that verticalities are all rooted over the notes of the bass voice, with the lone exception of m. 7's C– 6/3 that leads to the phrygian cadence on D+. The bass projects a descent by alternating major and minor thirds, a potent semantic vehicle by which the anguish of the speaker's persona is
realized musically. These downward thirds are an example of what Allan Atlas has called “a sixteenth-century trademark device for representing grief,” citing Josquin/Pierre de La Rue's usage of it in *Absalon Fili Mi*.\(^{37}\)

These descending thirds sung by the bass realize a segment of a vertiginous 24-cycle that would – if continued in perpetuity – visit each pitch twice before circling back upon its point of origin. Movements of the bass voice can be thought of as a partial realization of a cyclical transformational space in which “forward” moves are major or minor thirds in alternation. In the cyclic pitch-class space representation of figure 4.4 below, incremental clockwise moves correspond to the semantically charged steps of the descent by alternating major and minor thirds and they generalize at least some possibilities by which a sixteenth-century melody might convey grief. By realizing even part of this transformational space, a piece can take on the affective connotations signaled by the component descending thirds.\(^{38}\) The downward spiral of figure 4.3's space thus embeds numerous possibilities for a sixteenth century signifier of grief.

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\(^{37}\) Atlas 1998, 272. The attribution of this motet is now uncertain, though it was long thought to be the work of Josquin. The expression of grief via descending thirds is also featured in Josquin’s *Nymphes des Bois*.

\(^{38}\) As Lewin clarifies in *GMIT*, “We must conceive the formal space of a GIS as a space of theoretical potentialities, rather than as a compendium of musical practicalities. In a specific compositional or theoretical context, the space S of a GIS might be perfectly accessible in practice. […] in other compositional or theoretical contexts, the space S of a GIS might be pertinent as an entirety only to the extent it is suggested or implied by the actually stated musical material, plus the characteristic relationships actually employed” (27). Though Lewin makes his remarks with specific reference to generalized interval systems, they are no less pertinent for transformational spaces. According to Lewin, it is not necessary for a piece to realize all of the possibilities suggested by a particular transformational space for the characteristic relationships therein to be relevant.
At this point I wish to propose that in the setting of line 1, the bass voice's melodic realization of the <c, a, f, d> segment of this space serves as a harmonic basis for a related space of triadic transformations. Supported by the bass, who sings triadic roots, the voices collectively sing a series of major triads <C+, A+, D+, F+>. By association with the bass and its realization of a segment of the grief-projecting clockwise moves around figure 4.4, the triadic moves of the musical setting of line 1 become a harmonic signifier for the grief and anguish of the speaker. Likewise, Watkins notes that this “progression of triads, all major, whose roots move down by alternating minor and major thirds […] projects the heartrending note of the text.”\textsuperscript{39} Watkins 2010, 64.
points out that the “uncanny progression was not the only potent weapon in [Gesualdo's] arsenal.”

We can construct a space of triadic transformations to model the harmonies of line 1. They progress through a cyclic major triad space that is isographic to the cycle pitch-class space of figure 4.4. In fact, figure 4.4 gives a good approximation of such a space and we can imagine that the pitches of figure 4.4’s network represent triadic roots. The relevant segment of such a space is given in figure 4.5 with the score reduction. This network labels the triadic moves of line 1 as alternating RP and PL transformations, which could conceivably continue on in perpetuity, forming an <RP/PL> cycle. These alternating RP and PL gestures drive the voices of the motet through the harmonic moves specified by the melodic moves of the bass and thus become harmonic signifiers of the anguish and personal distress of the speaker.

Figure 4.5 Score reduction of line 1 with segment of RP/PL cycle realized in line 1

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40 Watkins 2010, 64. The “uncanny” progression, which in the parlance of triadic transformations exchanges a triad for its hexatonic pole (e.g. E+ to C–), can be heard in the opening of Gesualdo's *Moro Lasso*, from the sixth book of madrigals. The opening C# to A– gesture is one of the examples Cohn 2004 gives of this piquant transformation. To my knowledge, Cohn is the only author to engage any of Gesualdo's music in any kind of context related to triadic transformation.
Furthermore, these moves are, in a sense, overdetermined. Not only do they communicate the speaker's affective condition, they are also quite chromatic and (as previously noted) serve as effective attention grabbers. These two properties work in tandem to direct the listener's attention forcefully towards the speaker and to strongly imply that he/she is experiencing significant grief. As listeners, we prick our ears up at the chromatic moves of line 1 just as the spectators of the text's speaker turn their heads and attention towards the emotional outcry unfolding before them. Though the text of line 1 in and of itself makes no explicit mention of the speaker's personal distress, it can be palpably discerned through the suggestions of the musical setting, just as the states of mind of one's conversation partner can be intuited from non-verbal cues.

**LINE 2: EXHORTATION**

One thing that should be pointed out before moving on is the fact that the chromaticisms of line 1, while numerous and pungent, are all direct chromaticisms. However, as line 2 begins, a certain disjunction occurs. Instead of pursuing direct chromaticisms in the D+ to Bb+ motion in measure 8, the F# of the Alto passes by voice exchange to the f-natural of Tenor II and the a-natural of the Soprano passes by voice exchange to the b-flat of the Alto. These voice exchange chromaticisms mark a textual boundary between the identification of the addressee in line 1 and the exhortation to “attend to and see” (“attendite et videte”) in line 2.41

However, while chromatic exchanges characterize the boundary between lines 1

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41 This device of using chromatic exchanges to mark a boundary between syntactical units of the text setting is consistent with Gesualdo fondness for artifice. As Newcomb 1968 remarks, Gesualdo was in the habit of carrying with him scores of his music in score so that people could marvel at his notational and harmonic artifices (416). Clearly, Gesualdo was aware the notations themselves could provide information about the music that would be less obvious in listening. The chromatic exchanges that mark the temporal boundary between lines 1 and 2 signal
and 2, a certain continuity also marks the passage from the concluding D+ of line 1 to
the opening Bb+ of line 2. As the network of figure 4.5 demonstrated, an alternating
RP-then-PL pattern of triadic moves characterizes the harmony of line 1. To continue
the <RP/PL> patterning of line 1 would lead from D+ to Bb+, exactly the motion
observed in measure 8. The chromaticisms by exchange that signal the boundary
between lines 1 and 2 are thus counterposed against a transformational continuity. The
PL move we expect in continuation of line 1's <RP/PL> cycle is indeed what carries us
musically from the end of line 1 to the beginning of line 2.

Figure 4.6 Score reduction of line 2

Line 2, shown in figure 4.6’s score reduction above, conveys the speaker's
exhortation to “attend to and see.” Line 2 begins on Bb+ and lingers in measure 9 over a
b-flat “pedal” in the bass voice over which the upper voices trace 6/3 and 6/4 sonorities
hinting at fleeting G- and Eb+ triads, respectively. At measure 10, the bass finally moves,
descending by minor third to g-natural, over which the other voices spell G–. As this
measure progresses, the alto pursues an ascending b-flat, c, d line that drives the music
towards e-flat and the C– of the second half of m. 10, a move accompanied by the bass
voice's corresponding motion to a c-natural. We can firmly sense here that the music moves from the Bb+ of mm. 8 and 9 to the G– and C– of measure 10. The bass voice has moved from b-flat to g-natural, an expectation prefigured by the pattern of motion it pursued in line 1. However, the bass skips the e-flat that would follow in a strict alternating pattern of descending major and minor thirds, instead moving directly to c-natural.

Because of this, the music does not give a firm Eb+ over an e-flat bass. However, I wish to propose that with regards to the musical space alluded to by the music of mm. 9 and 10 in line 2, there is a sense in which an e-flat in the bass and an Eb+ triad built above it can be regarded as missing in the musical realization. The pattern of bass voice moves pursued in mm. 1-10 is strongly consistent and primes us to expect its continuation. Thus it registers as a subtle surprise that no e-flat occurs in the bass voice. However, while we sense that e-flat is “missing,” the obverse to this intuition is that e-flat ought to belong. Thus, we can mentally interpolate an e-flat into the generalized musical space suggested by the bass in lines 1 and 2 once we intuit that, though e-flat has been skipped, if it had shown up, its presence would make sense.

I wish to further probe that idea that the triadic space implied by line 2 alludes to the presence of an Eb+, though it is never firmly realized in the music as a triad rooted over a bass voice e-flat. In fact, we do get a sense of the presence of Eb+ in the transient flash of major mode brightness at the very end of m. 9. As the alto sings e-flat at the very end of measure 9, we can a suggestion of Eb+ sonority in the 6/4 built over the b-flat pedal of m.9. Notice, too, that the alto leaps a considerable distance from its e-flat at the end of m. 9 to its b-flat at the beginning of m. 10, instead of resolving semitonally to d-natural, a pitch sung by tenor I instead. Thus, for one voice of this
motet, the alto, moving to the G– of m. 10 is quite effortful. Alto resists the pull of e-
flat towards the d-natural to which it might otherwise be lead and fights to land on the b-
flat at which it begins its stepwise ascent in m. 10.

Before this, the soprano, responsible for the 6/3 in measure 9 suggesting G–
(with alto's lingering f–natural), also makes an effortful motion by fifth. Soprano leaps
down by a fifth in measure 9 from d–natural to g–natural and is thus responsible for the
rather tense G– sonority (with alto's lingering f-natural) that makes a brief appearance
before alto resolves to e-flat. This tension dissipates as the alto's lingering f-natural
resolves to the e-flat at the end of measure 9. The point is that we can sense the G– and
Eb+ sonorities in measure 9 over the bass voice's b-flat as quite real presences, not
simply reducible to being written off as part of the increasing linearity that develops in
line 2. Thus, line 2 can be heard to imply a segment of a mode-reversing triadic space
involving Bb+, G–, Eb+, and C– nodes connected by R and L transformations. The
relevant segment of this space is shown below in figure 4.7 with the reduction.

Figure 4.7 Score reduction of line 2 with segment of R/L cycle implied by line 2
Attending to the patterning of moves that defines this space also sensitizes us to the sense of disjunction encountered upon arriving at measure 11. As the network of figure 4.7 suggests, continuation of the <R/L> transformational pattern would lead from the C– of the end of measure 10 to an Ab+ sonority via an R transformation. Instead, we move not from C– to Ab+ but instead from C– to an A– in 6/4 position that then leads to an unexpected plagal resolution onto an E+ (rooted over the e-natural of the bass). The abrupt, almost “inserted” quality of this cadential gesture is captured by the way the network of figure 4.7 generates the unfulfilled expectation that an Ab+ sonority will follow the C– of measure 10. Moving from C– to the A– 6/4 of measure 11 is not the L transformation that figure 4.7 suggests should happen occur, but is instead a PR gestalt. Motion from C– to measure 11's eventual resolution on E+ (both chords rooted over the bass) also fails to preserve the transformational patterning of the network of figure 4.7. This overall motion from root position C– to root position E+ is a highly disjunctive hexatonic polar relation (PLP or LPL transformation), as discussed in chapter 2. This startling move brings line 2 to a close, and concludes the portion of the text in which the speaker first cries out to capture the attention of the bystanders and suggests his/her immense personal grief.

**LINES 1 AND 2: TRANSFORMATIONS OF TRANSFORMATIONAL SPACES AND AFFECTIVE STATE**

As mentioned towards the beginning of this chapter, lines 1, 2 and 4 direct attention towards the persona of the speaker and his/her subjective states. Taken in isolation, the text itself, however, does not make any reference to the personal anguish of the speaker until line 4. But Gesualdo's setting introduces a potent signifier of grief in
line 1 and an emotionally turbulent state is attributed to the speaker’s persona. We have seen how in line 1 the melodic signification of grief traced by the bass voice transfers its connotations to the harmonic domain. The triadic moves of line 1 thereby come to signify the personal anguish of text's speaker.

What I wish to propose is that this harmonic representation of grief extends through line 2 until the hexatonic polar transformation that leads into measure 11. Organizing our hearings of lines 1 and 2 around the networks of figure 4.5 and 4.7, respectively, we can see that very similar yet different cyclic transformational spaces can be discerned from lines 1 and 2. Line 2 can thus be heard in continuity with line 1, since it pursues a similar “thirdsy” organization of triadic transformation space. The key difference between lines 1 and 2 is that the transformations that structure the space associated with line 1 are mode-preserving, while the transformations that organize the space of line 2 are mode-reversing. Since both of these transformational spaces are cyclical in nature, a more generalized comparison of the spaces associated with lines 1 and 2 can be performed when node content is left unspecified as in figure 4.8 below. These transformation graphs help us attend to the transformational moves that take us through these transformational spaces, foregrounding the transformational similarities and differences.42

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42 When a transformational representation is given without specified node content, only with labeled transformational arrows, it is called a transformation graph as opposed to a network, which specifies node contents. Lewin develops this distinction in a 1982 article as well as in GMIT. As Lewin (1982a) indicates, a transformation graph is transformationally fully determinate before node contents are specified, and it focuses the attention on transformational “gestures” rather than on the specificities of what objects are involved in realizing them in a musical situation (325).
Figure 4.8 Segments of cyclic transformation graphs corresponding to RP/PL cycle of line 1 and R/L cycle of line 2.

Figure 4.8 makes visually clear how the cyclic transformational spaces suggested by lines 1 and 2 are organized by similar moves. Showing both cycles in their entirety (impractical for space reasons) would also demonstrate that both cycles require 24 moves to achieve closure. However, it will be helpful to look at patterns of triadic modes in lines 1 and 2. The graphs of figure 4.8 can be filled in with triadic mode information reflective of the music of lines 1 and 2 as in figure 4.9. Figure 4.9 compares the all-major, mode-preserving transformational space explored in line 1 with the mode-reversing transformational space explored in line 2.

Figure 4.9 Graphs of figure 4.8 filled in with appropriate triadic mode information (+: major, −: minor).
We can continue further and collapse the two spaces shown in figure 4.9 into a single transformational space with more path possibilities. This is shown in figure 4.10 below. The more inclusive representation of figure 4.10 merges the spaces shown in figure 4.9 into a single space. If we were to envision the entire, closed circular space, of which figure 4.10 shows a local segment, we could travel around its perimeter along a mode-preserving path (shown with broken arrows) or along a mode-reversing path (shown with continuous arrows). As we move through line 1, we travel along the all major broken arrow path. Then, in line 2, we switch to traveling along the mode-reversing continuous arrow path. Switching from traveling down the all-major path to the mode-reversing path might be compared to driving down a road with two lanes: one paved with asphalt, the other still gravelly and unfinished. At some point during our drive, corresponding to the beginning of line 2, we merge into the other lane.

Figure 4.10 Segment of a more inclusive transformational space with RP/PL path and R/L path
Though the metaphor here is imperfect, the relevant idea is that there is one road can be discerned in lines 1 and 2 though qualities of the ground underfoot change. More specifically, the moves we make in order to go down the road change fundamentally in character. RP gestalts that connect two major triads in line 1 are transformed into R gestalts in line 2, which lead from a major triad to a minor one. Likewise, the PL gestalts of line 1 are transformed into the L gestalts of line 2, which carry us from a minor triad to a major triad. The mode-preserving RP and PL moves between major triads of the transformational space implied by line 1 are transformed into mode reversing R and L moves in the transformational space implied by line 2. This is represented in figure 4.11, which divides the isographic networks of figures 4.1a and 4.1b into mode-preserving and mode-reversing zones. The transformational arrows between nodes in figure 4.11 not only show transformations of PLR group transformations but also provide transit between “locations” in the mode-preserving and mode-reversing zones. Bold arrows in figure 4.11 show how RP is transformed into R, and how PL is transformed into L. In the context of line 1, the RP and PL moves have total major mode character. As the music enters line 2, the RP and PL moves are transformed into the minor mode tinged R and L moves that characterize the space explored by line 2.
Figure 4.11 Transformations of PLR transformations as transit between locations in mode-preserving and mode-reversing zones in context of lines 1 and 2
Similar transformational spaces can be discerned in lines 1 and 2, but line 2 becomes infused with minor mode character. Instead of continuing the bright, all major mode-preserving moves, line 2 introduces the increasingly mournful sounds of minor triads. The absence of a firm Eb+ presence over a steady e-flat bass in line 2 is consistent with this increasing tendency towards inclusion of minor mode and brings out the minor mode's more negative affective connotations as described by Lippius and others. As mentioned previously, the harmonic signification of grief (movements between triads rooted over the descending thirds of the bass) can be heard to extend through the end of measure 10 and can be heard as increasingly infused with the morose qualities associated with minor mode triads. The triadic moves of line 1 are transformed into similar but affectively more pained triadic moves in line 2. Not only does Gesualdo set lines 1 and 2 to a signifier of personal grief, the signification becomes increasingly pained as Gesualdo manipulates the presences of major and minor. Pain indelibly marks the voice of the speaker here. When the speaker leaves the exhortation to “attend to and see,” wide open at the end of measure 11, we already have a distinct sense of what the ultimate object of contemplation is to be before lines 3 and 4 make explicit mention of it. If not the acute personal suffering of the speaker, what else? 

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43 With the intense implication of grief in lines 1 and 2, if the rest of the speaker's oration neglected to reflect upon this aspect of the speaker's frame of mind, I think there would be a sense that both music and speaker had made lamentably inept attempts at deceit and concealment.
LINES 3 AND 4: THE INDEFINITE OTHER AND THE SELF

Figure 4.12 Score reduction of line 3

Line 3, shown in the reduction of figure 4.12, marks a stark departure from the rather homophonic sound world of lines 1 and 2. It is instead quite linear and the syllabic declamation of the text “sicut dolor meus” is largely asynchronous. In line 3, the speaker directs our attention to the experience of pain external to his/her own. The speaker asks us to attend to and see what sorts of pain exist outside of his/her own experience, thus directing the observer towards contemplating the subjectivities of the indefinite other (anybody else's pain, the pain of everyone else). We can hear that the five voices have a much greater degree of independence from one another than they did previously; this asynchronicity of the declamation allegorizes the multiplicity of the indefinite other. That is, in hearing the separation of the activities of the multiple musical voices, we can hear that the grief of the indefinite other refers to emotional states that reside with numerous others. This line turns the attention of the speaker's audience towards the many possible sites of the experience of suffering external to the persona of the speaker.

Harmonically, too, lines 1 and 2 are heard as disconnected from line 3. The plagal resolution from A– 6/4 to E+ rooted over the e-natural of the bass, is rather more continuous with the material that follows in line 3 than it is with the music of lines 1 and 2. Recall that the overall motion from the C– of measure 10 to the resolution to E+ of
measure 11 is a highly disjunctive hexatonic polar transformation. Line 3 begins with the e-natural of tenor II and the subsequent a-natural of the bass, and in moving from measure 17 to measure 18, reuses the 6/4 to 5/#3 onto E+. The harmonic sphere of line 3 is not marked with the instability and pungency found in the music of the other lines. Though we can observe numerous linear chromaticisms in line 3, their harmonic qualities do not call attention to themselves to anywhere near the extent of the chromaticisms of lines 1, 2 and 4. Also, unlike the other lines, there is a preponderance of 6/3 voicings in line 3, whereas root position voicings tend to dominate lines 1, 2 and 4. Measure 13 begins with a G– voiced over the b-flat of the bass. The bass then ascends to e-natural, over which an A– is voiced at the outset of measure 14. We hear more 6/3 voicings through measure 16 and the familiar 6/3 to 5/#3 resolution onto a root position E+ occurs in measure 17-18. Measures 19 and 20 conclude line 3 with a descending cascade of suspensions built atop chordal thirds sung by tenor I. Musically, line 3 is the oddball among the four lines of Gesualdo’s five-voice O Vos Omnes. Its lack of chromatically charged, pungent harmonies and its tendency towards 6/3 voicings serves to musically reinforce the distance and alienation of the text’s speaker from the indefinite other. The considerable differences between the sound worlds of line 3 one the one hand and of lines 1, 2 and 4 on the other allegorize a gulf between the narrative self and the outside world.

Line 3 effectively ends with the Bb+ 6/3 of measure 20’s first half, and line 4 begins with an E– voiced over tenor II's e-natural in the second half of measure 20. The boundary between lines 3 and 4 at measure 20 is marked by a piquant harmonic disjunction. Once the soprano sings b-flat to the syllable “lor” of “sicut dolor” resolving onto a Bb+ in 6/3 position, tenor II then joins in with his e-natural over which the three
higher voices sing the pitches of an E–. This motion is a near-octatonic pole transformation as discussed in chapter 2 (the move between Bb+ and E+, triads of the same mode with roots separated by a tritone, would be an octatonic-polar transformation). This motion from Bb+ to E– also takes advantage of major-minor contrast (unlike an octatonic-polar transformation, which is mode-preserving) and strives to create a maximal sense of disjunction as the music moves from line 3 into line 4.

We hear that the music of line 3 is bounded by harmonic cleavages that sever it from the material of lines 1, 2 and 4. This foregrounds the sense that the music strongly reinforces the alterity of the first-person subjectivity of the text. The musical disjunctions that bound line 3 and its contrasts with the previous material suggest that, for the speaker, the sense of the outside world as alien and “other” is just as strong as the sense of isolation and alienation experienced by the speaker. Line 4, shown in the reduction of figure 4.13, contrasting sharply with line 3, makes very clear that the pain of the speaker is a unique and singular pain, circumscribing and setting acutely apart the speaker.

Figure 4.13 Score reduction of line 4
Line 4 directs attention back towards the persona of the speaker, focusing on setting the words “sicut dolor meus” in a particularly affecting manner. Like lines 1 and 2, line 4 is characterized by homophony, with structural sonorities being rooted over the lowest voice. Line 4 contains two iterations of “sicut dolor meus,” approximate transpositions of one another. Mm. 23-25 roughly repeat the material of mm. 20-22 at the distance of a perfect fourth below. In both of these iterations, harmonically pungent moves that set the words “dolor meus” mark the pain belonging to the speaker as especially acute. In the first iteration, the words “dolor meus” are set to a motion from an E+ over the e-natural of the lowest voice (in this case, tenor II) to a G– 6/4 that resolves to D+ by the end of measure 22. The second iteration begins on B+ and sets the words “dolor meus” to a motion from B– (the parallel minor of B+) to a D– 6/4 that then resolves to A+. The motions to the 6/4 chords call attention to themselves and are particularly piquant in both instances, registering both times as stirring and affecting inflections to the words “dolor meus,” related yet different characteristic gestures in the Lewinian sense. These similar yet different moves treat the personal pain of the speaker with great reverence; the uniquely singular piquancy of these harmonic moves serves to allegorize not just the intensity but also the unique singularity of the speaker's pain. They are harmonically as palpable as the pain they are meant to signify is.44 Furthermore, these settings of the words “dolor meus” have not lost their impact over the years. Comments to YouTube videos of this very motet have singled out these moments, remarking explicitly on their strikingly heartrending qualities.

44 On this, see Einstein 1949. Einstein identifies the setting of “sicut dolor meus” as being an instance when “harmony becomes almost a gesture in its chromaticism and its clashes” (694). Indeed, this observation resonates nicely with our gestural-transformational approach to these harmonic motions.
The transposed repetition of line 4's material is non-exact, as highlighted in figure 4.14 above. The first iteration sets the words “dolor meus” to a mode-reversing PRP motion between the E+ ("dolor") of measure 21 and the G−6/4 ("meus") that begins measure 22. The second iteration starts on B+ and shifts in measure 24 to the parallel B− during the word “dolor.” After a lengthy, mournful stasis on B− ("dolor"), the arrival onto D−6/4 ("meus") occurs via an RP gestalt of total minor mode character. With the repetition of material in line 4, we notice that the move that imparts great immediacy to the words “dolor meus” has changed. As figure 4.14 shows, the first iteration's PRP transformation drives the “dolor” node to the “meus” node, while in the second iteration, an PR transformation drives the “dolor” node to the “meus” node.

Having now assigned transformations to the moves over the words “dolor meus” that carry us to the 6/4 chords, we can now model how they change as line 4's material repeats in much the same way as we did in figure 4.11. Figure 4.15 again represents transformations of PLR group triadic transformations as transit between mode-reversing and mode-preserving zones.
Repeating the setting of “dolor meus” has involved transforming the PRP gestalt between the E+ and G– 6/4 of the first iteration into an RP gestalt corresponding to the move between the B– and D– 6/4 of the second iteration. That is, as figure 4.15 demonstrates, a PRP transformation has been transformed into an RP transformation over the course of line 4. These homologous motions (PRP and RP) in the two roughly transpositionally equivalent iterations of “sicut dolor meus” develop the idea that the harmonic representation of the speaker's dolor employed in line 4 grows increasingly dolorous as line 4 moves to completion. It becomes fully saturated with minor mode character and the affective connotations of the minor mode. Gesualdo heightens the device he uses to musically represent pain in line 4, not simply repeating it.
A musical device for signifying pain in line 4 has thus been intensified in a way similar to how the descending third space of line 1 was affectively intensified with the minor mode in the space of line 2. Transforming characteristic moves into similar moves that carry greater minor mode character can be regarded as something of a transformational motif that characterizes the lines associated with attention towards the speaker. In lines 1, 2 and 4, tendencies towards increasing minor mode character in repetition add an additional punch to the repeating representations of personal dolor which have figured so prominently in our experience of the motet. These devices foreground the specialness and intensity of the speaker's personal pain. Pain outside of the speaker's own has come to seem rather paltry in comparison. Lines 2-4 repeat in performance, reiterating the sharp depiction of inner anguish.

**Gesualdo Myths**

One lurking question in the foregoing discussion is this: who, really, inhabits the first-person perspective of the musical oration? As previously mentioned, the text is spoken by the personified Jerusalem of the Old Testament book of Lamentations. However, its liturgical context encourages us to primarily imagine the text's speaker as the suffering Christ, whose crucifixion is commemorated during Holy Week in the Tenebrae. To these two voices, we must add that of the composer himself. The idea that this motet is representative of the composer's well documented personal anguish has been explored before in the Gesualdo literature. Watkins, for example, calls this setting of the *O Vos Omnes* text “one of the most strikingly personal treatments it has ever
received.”45 Einstein's massive study of Italian madrigals, a secular genre, includes a discussion of Gesualdo's sacred motets, indicating that in this sector of the composer's output “anyone determined to connect the music of Gesualdo's motets with his life would find them richly rewarding. They consist of nothing but cried of anguish, self-accusation and repentance.”46 A liturgical piece depicting suffering of Christ and the fictional widow in the book of Lamentations has been reappropriated by Gesualdo here as a personal cry of distress and anguish. This O Vos Omnes reads as a statement of Gesualdo’s personal suffering, as unique and profound for the composer as the suffering of his biblical sources.

Gesualdo, infamous for committing the gruesome double murder of his first wife and her illicit lover after having caught them in the adulterous act, is commonly caricatured as a murderous madman. Fancifully, his highly chromatic music has been attributed to his now mythical mental instability. However, it is certainly more accurate to view his chromatic technique as a product of his training with the avant-garde Ferrarese composers of the late sixteenth century.47 Gesualdo's biographers, most notably Watkins, counter the caricature of Gesualdo the psychopath by remarking somewhat sympathetically and more realistically that the composer was deeply anguishihed by the crimes for which he is now famous. Tormented by guilt for the remainder of his life, Gesualdo was known to have practiced self-flagellation – though it must be stressed that this was in fact a prescribed Jesuit rite of penitence (sanctioned, for instance by St. Ignatius of Loyola) rather than the psychotic delight of a deranged masochist as popular

46 Einstein 1949, 692. This passage was brought to my attention by Watkins 1973 (252).
47 On this, see Watkins 1973, Watkins 2010 or Bianconi, "Gesualdo, Carlo, Prince of Venosa, Count of Conza."
lore would have us believe. Gesualdo projects in his sacred music, according to Einstein, a strong association between “the sufferings of the dying Christ (and) those of the composer himself. We sense that Gesualdo, the creator of those endless pleasure-pains in his madrigals, has seized here upon the ultimate vehicle for self-flagellation.”

As Watkins notes, “paradoxically, there had been no precedent for Tenebrae music of a highly emotional tone,” remarking that “even Rore, the composer of affective madrigals, is no more than an uninvolved commentator in his Passion.” Gesualdo’s sacred music thus presents a challenge to scholars. Philosophers such as Lydia Goehr have argued that it is not necessarily appropriate to bring terms such as “musical work” and “artist” to bear on all discussions of music. Goehr argues that concepts of the “musical work” and of the composer as “artist” are romantic ideas that did not become regulative for musical practice until after (roughly) 1800. To summarize, composers before (roughly) 1800, typically in the employ of patrons or churches, worked more like music directors/coordinators, supplying music for various occasions as needed and as paid. Romantic ideas of compositions as self-expressive artworks are more at home in discussions of Chopin and Schubert, according to Goehr’s argument. However, Gesualdo, as a member of the royalty, was not a musical “worker” in the way that his contemporaries and predecessors were. Gesualdo is thus an anomaly. As a man of noble birth, he wrote his music under conditions quite different from those of other pre-1800 composers. Gesualdo was thus both patron and creator of his music and was free to engage his compositional whims in ways we associate more closely with the

48 Watkins 2010, 60.
49 Einstein 1949, 694. This reference was brought to my attention by Watkins 1973 (268).
51 Goehr 2007.
working practices of nineteenth-century composers.\textsuperscript{53} This fact, along with the surface similarities between the chromatic harmonies of Gesualdo’s later music and those of later nineteenth-century composers, has contributed to the uncomfortably teleological view of Gesualdo’s music as a compositional antecedent to adventurous passages in the music of Schubert, Wolff or Wagner.\textsuperscript{54} In my application of neo-Riemannian transformations to my expressive reading of Gesualdo’s 1603 \textit{O Vos Omnes}, in no way do I mean to support this teleology. I have, however, strived to perform a hermeneutic reading of the motet in much the same way as I might like to approach a selection from the \textit{Winterreise} or Mörike-Lieder. Again, this should not be adduced as evidence in support of a teleological grand narrative linking Gesualdo to the composers of the nineteenth-century. It might better be understood as a reflection on Gesualdo’s unusual biography and circumstances of birth.

The transformational reading of this motet investigates Gesualdo’s immensely emotional portrayal of personal pain in an effort to connect the piece with the composer’s biography. The obsessive, sin-induced dwelling on themes of contrition and penitence that Gesualdo’s biographers note in his sacred ouevre accompanies a heavy, guilt-ridden suffering according to the reading that our transformational tools have helped to develop for this motet. The portrait of the composer I seek to support in this reading is not that of the violent psychopath from popular myth, but that of the anguished, penitent sinner reminded time and again of his iniquity before God.

\textsuperscript{53} Waktins 1973, 90.
\textsuperscript{54} Admittedly, these surface similarities initially motivated my interest in a neo-Riemannian exploration of Gesualdo’s late style in earlier versions of this thesis.
O Vos Omnes

Carlo Gesualdo

Plate 4.1 Score of Gesualdo’s five-voice O Vos Omnes of 1603
Plate 4.1 (continued)
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**Scores**


