
Neo-Riemannian Theory as Voice Leading Pedagogy

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While voice leading in undergraduate music theory courses is often assumed to be tied to chorale harmonization or species counterpoint, Neo-Riemannian theory (NRT) offers another way of engaging deeply with the succession of harmonies and the movement of individual voices, and which offers a different view of musical structure. As a tool that offers insight into relationships both between individual triads and across large spans of music, NRT helps students understand the numerous roles that voice leading can play in various styles of music. In so doing, it offers them a foothold into new repertoires, building upon students' knowledge of harmony or voice leading and exploring both in productively different ways. That is to say, it offers one way of supporting David Huron's suggestion that voice leading is relevant for much more than four-part chorales.¹⁵ In this essay, I will describe one model for including NRT in core undergraduate courses, and outline a sample modular curriculum that draws on current research in the field.¹⁶ This framework may be adapted freely in order to introduce students to exciting, advanced concepts in music theory; to incorporate non-canonical repertoires; to connect the music theory classroom to other areas of music, the humanities, and mathematics; and to offer a gentle introduction to many of the concepts introduced in the course on twentieth-century techniques that often ends the theory sequence. While it is true that incorporating NRT does not, on its own, counteract the strong focus on harmony (to the detriment of other topics, such as rhythm) that Marcelle Pierson's contribution discusses, I will argue that it can help students to think differently about previously learned materials (such as repertoire they have already studied through the lens of diatonicism), demonstrate how simple concepts can be expanded to generate new theoretical insights, and introduce

¹⁵ Huron (2019).

¹⁶ In this essay, I use the term "Neo-Riemannian theory" to refer to a broad spectrum of transformational and geometric approaches to the properties and syntax of triads and seventh chords: what Richard Cohn describes as "that branch of transformational theory that takes consonant triads for its objects, and subjects those objects to transformations that minimize voice leading"; see Cohn (2012, 40). I apply the label whether they belong directly to the Neo-Riemannian lineage that follows from publications like Lewin (1987) and Hyer (1995); to the tradition of scale theories and mathematical mappings of triadic space such as Hook (2002); to geometric accounts of musical space such as Callender, Quinn, and Tymoczko (2008, 346–48) and Tymoczko (2011). While Cohn reflects on the inappropriateness of the label for contemporary triadic theories, I believe that "Neo-Riemannian" still usefully and intuitively describes a constellation of related theories, even if their scope has expanded far beyond the original influence of Hugo Riemann.

repertoires less frequently studied in music theory classes.

I am not the first to advocate for NRT's inclusion in the undergraduate curriculum. Nora Engebretsen and Per Broman (2007) offer a comprehensive introduction to the topic, presenting analytical, compositional, and even ear-training exercises to introduce undergraduates to triadic transformations.¹ Given NRT's expansion over the past fourteen years, however, the time is right for a new exploration of the topic that builds on the foundation laid by Engebretsen and Broman. Over that time, at least two major changes have swept through the field. First, contributions such as Steven Rings's *Tonality and Transformation*, Dmitri Tymoczko's *A Geometry of Music*, Suzannah Clark's *Analyzing Schubert*, Richard Cohn's *Audacious Euphony*, and Frank Lehman's *Hollywood Harmony* have all found new ways to expand, synthesize, and unify the insights offered by Neo-Riemannian theories. The latter two scholars especially have emphasized the voice-leading properties of triads over the metaphors of movement and transformation that characterized NRT's early days. Cohn has described triads as ideal voice-leading objects due to their group structure (which allows them to lead smoothly from chord to chord in several ways), while Tymoczko has positioned triads within a much larger model of trichordal (and other cardinality) voice leading in geometric space.² Second, in addition to this methodological refocusing, many scholars have expanded the scope of Neo-Riemannian theory, applying its insights to popular music,³ film music,⁴ video game music,⁵ jazz,⁶ and other styles. Because of the growth of NRT over the past decade, and the field's growing interest in triadic and seventh-chord transformations as voice-leading phenomena, the study of Neo-Riemannian theory is more vital—and more relevant for undergraduates—than ever.

Transformations

I teach NRT near the end of the third semester of a four-semester sequence, the last semester of which is focused primarily on post-tonal music. By the time we approach the unit, students are generally familiar with the basics of chromatic harmony and form, along with a thorough grounding in harmony (including chorale-style part writing), counterpoint, and figured bass from the first year of music theory. The curriculum I employ is structured in five steps: Transformations, Abstraction,

1 Engebretsen and Broman (2007).

2 Cohn (2011, 33–41) and Tymoczko (2011, 65–115).

3 Capuzzo (2004); and Forrest (2017).

4 Murphy (2013); and Lehman (2018).

5 Reale (2015).

6 McClimon (2016) and (2017).

Multiple Perspectives, Extensions, and Applications. Some of these steps may be covered quickly, while others can unfold across several class sessions, depending upon the amount of time available. The first three are the most important for the purposes of this article, and will be discussed in the greatest detail. Example 1 offers a brief summary of the curriculum.

Unit	Concepts/Skills Taught	Sample Repertoire
Transformations	Introduce PLR transformations as simple voice leading phenomena	-- Schubert, Piano Trio in E<flat> (Op. 100), 1st mvmt. -- Wieck, “Nocturne” from <i>Soirees musicales</i>
Abstraction	Discuss pitch vs. pitch class and “idealized” voice leading. Introduce <i>Tonnetz</i>	-- Beach, “Autumn Song”
Multiple Perspectives	Re-visit repertoire previously studied in mode mixture unit, apply Neo-Riemannian perspective	-- Schubert, “Schwanengesang” (D. 744)
Extensions	Numerous, at instructor’s discretion. Alternate visualizations (chicken-wire torus, Cube Dance); mathematical/geometric underpinnings of NRT; additional transformations (S, N, H, etc.); seventh-chord spaces; history (Riemann, dualism)	Varies; my class emphasizes film soundtracks: <i>Vertigo</i> (1958), <i>Batman Begins</i> (2006), <i>Inception</i> (2010); other candidates include Chopin E Minor Prelude, Op. 28, No. 4 and other piano works (see Tymoczko 2011, 284-293)
Applications	Composition using pan-triadic vocabulary	Student film scores

Example 1

A Sample Modular Curriculum in Neo-Riemannian Theory.

My students begin their study of Neo-Riemannian theory with the canonical PLR operations: parallel, relative, and *Leittonwechsel* (“leading tone exchange”). Example 2 offers a simple guide to the transformations mentioned in this article.⁷ After introducing the operations, I use simple and direct examples that demonstrate them clearly, preferably in distinct voices that students can hear and sing along with. For example, the passage in Example 1 is taken from late in the first movement of

⁷ In this essay, I presume that readers have some familiarity with Neo-Riemannian theory, but they need not be experts. For a comprehensive overview of transformations in common circulation, see Lehman (2018, 90). For an overview of the group-theoretic organization of the parsimonious transformations discussed in this essay (including some of the “alternative visualizations” mentioned in Table 1), see Cohn (2011, 83–109). While the systems outlined by Cohn and Lehman (and earlier, Lewin and Hyer) broadly intersect and agree with one another except in fine details, completely separate transformational vocabularies exist as well: see, for example, Julian Hook (2002)

Franz Schubert's Piano Trio in E_b op. 100. As Example 3a shows, each transformation is clearly audible in a single voice (as when G moves to G_b at the top of the violin's double stop in m. 586), allowing students to grasp transformations first as simple voice-leading movements.⁸ As shown in Example 3b, the entire passage outlines a complete cycle of alternating PL transformations, comprised of the major and minor triads on E_b , C_b/B , and G.

Transformation	Action on a C+ triad
P - parallel	$C+ \leftrightarrow C-$
R - relative	$C+ \leftrightarrow A-$
L - Leitonwechsel	$C+ \leftrightarrow E-$
D - dominant*	$C+ \leftrightarrow G+$
S - Slide	$C+ \leftrightarrow C\#-$
N - Nebenwervandt	$C+ \leftrightarrow F-$
H - Hexatonic pole	$C+ \leftrightarrow A\#-$

Major triads are signified by +, minor triads by -. Each transformation listed here reverses itself, and can be chained together with others as a compound transformation (i.e. applying P and then L = "PL"). The first three transformations hold two tones while moving the third by a step; S and N hold one tone while moving the others by a half step; and H moves each of the triad's three tones by a half step.

** The dominant transformation is not only a compound of two PLR transformations (L and P), but also a way of expressing the tonal relationship of tonic and dominant within an otherwise pantriadic context.*

Example 2

Triadic transformations mentioned in this article.

$E_b+ \xrightarrow{P} E_b-$

Example 3a

Example of direct transformation in Franz Schubert, Piano Trio in E_b major (Op. 100), 1st mvmt., mm. 584–87 (violin and cello parts only).

⁸ Richard Cohn outlines the first part of this passage in his discussion of PL cycles; see (2011, 27–28).

584

E_b^+ \xrightarrow{P} E_b^- E_b^- $\text{Ger } \frac{6}{5}$ $(V_4^{\frac{6}{4}} \frac{5}{3})$ E_b^- \xrightarrow{L} C_b^+

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$(V_4^{\frac{6}{4}} \frac{5}{3})$ C_b^+ \xrightarrow{P} B^- B^- $\text{Ger } \frac{6}{5}$ $(V_4^{\frac{6}{4}} \frac{5}{3})$ B^- \xrightarrow{L} G^+

604

G^+ \xrightarrow{P} G^- G^- $\text{Ger } \frac{6}{5}$ $(V_4^{\frac{6}{4}} \frac{5}{3})$ G^- \xrightarrow{L} E_b^+ $(V_4^{\frac{6}{4}} \frac{5}{3})$ E_b^+

Example 3b

Reduction of Franz Schubert, Piano Trio in E_b flat Major (op. 100), 1st mvnt., mm. 584–613.

Example 4 depicts another excerpt I use frequently when initially introducing the PLR group of transformations. The opening measures of Clara Schumann's "Nocturne" (from *Soirées musicales*, op. 6, no. 2) contains a chromatic passing motion in the left hand that outlines the whole step traversed by the R transformation: C, as the top voice of F^+ , passes through $C\sharp$ in m. 3 (creating an augmented triad) to D in m. 5, arriving at D^- . By studying examples like these (and completing simple worksheets that ask them to write transformations between various triads), students can practice the basic PLR operations until they become fluent with them.

Andante con moto

R

Example 4

Clara Wieck [Schumann], “Nocturne,” from *Soirées Musicales* (1836), Op. 6, No. 2, mm. 1–6

Abstraction

Near the beginning of *Audacious Euphony: Chromatic Harmony and the Triad’s Second Nature*, Richard Cohn proposes a method for calculating the distance between any two triads, in terms of the “voice-leading work” necessary to move from one to the other. Movement by one semitone constitutes one “unit” of labor, so that moving from G⁻ to G⁺ requires one unit of voice-leading work (B^b to B), while G⁻ to D⁺ requires two (G to F[#] and B^b to A), and so forth. Of the subtle theoretical leap inherent in this analysis, Cohn writes:

In counting common-tone connections in a particular passage, we have implicitly assumed that voice leading is *idealized*. In most compositions, tones freely transfer registers, and multi-octave tone doublings liberally appear and disappear. We say that two triads have a common tone even when, in a particular setting, those tones appear one or more octaves apart. . . . When we speak of common tones, then, we are adopting a conception of *tone* that is allied with *pitch class* rather than pitch. There is nothing special about idealized voice leading; music theory teachers and scholars assume it every day of their working lives. It is so familiar, indeed, that it takes a special effort to acknowledge it.⁹

Along with helping to illuminate his conceptual framework, the passage above articulates both the power and challenge of abstraction in the music theory classroom. Music theories work by abstraction: their explanatory power comes from their ability to be generalized across a wide variety of musical situations. Many arguments for the value of teaching with four-part chorale-style exercises and species counterpoint rest on the idea that each imparts principles that can be applied much more broadly than worksheets and examinations.¹⁰ While “laboratory” exercises may offer a certain utility, music theory’s abstraction—that is, the gap between those exercises and

⁹ Cohn (2011, 6).

¹⁰ On the transferability of part-writing skills, see Marcelle Pierson’s contribution to this colloquy.

musical practice, or in Cohn's terms between the movement of theoretical objects and musical ones—is too often left unexamined in undergraduate instruction, leaving students frustrated at what they perceive as capriciousness in the enforcement of rules, particularly when counterexamples are easily found in musical literature.¹¹

The leap that NRT enacts—from parsimonious movement in single voices to compound transformations, registral shifts, and long spans of pan-triadic harmony—requires of students the same conceptual shift that chorales do: from the controlled “laboratory” environment of direct half-step movements and idealized models, to the more varied examples found in real scores. Making this leap is also preparation for the pitch/pitch-class distinction. After gaining familiarity with the basic operations and seeing them in action in simple textures, students are ready to approach less obvious examples, which can be taken from published analyses in any of the sources cited in this essay, or through the analysis of repertoire selected by the individual instructor. This offers an entry into the concepts of pitch classes and pitch-class space, by helping students to understand Neo-Riemannian operations not only as epiphenomena of parsimonious voice leading, but as transformations that operate on [037] triads. This offers a convenient introduction to pitch-class set theory.

Analysis from Multiple Perspectives

One strategy for supporting the conceptual leap from concrete to idealized voice leading involves circling back and using triadic transformations as a way of re-interpreting previous musical examples. Until recently, my institution used Steven Laitz's *The Complete Musician* in its core theory classes. In Laitz's chapter on mode mixture, he cites the example of Franz Schubert's “Schwanengesang,” an 1822 song on a text by Johann Senn unrelated to the later song cycle of the same name. “Schwanengesang” is notable for its sometimes uncertain key; despite its A-flat-major key signature, the very first chord heard is A-flat *minor*. Laitz uses the song to illustrate two forms of mode mixture: “melodic mixture,” in which upper chord tones are altered to create chords of opposite mode quality (i.e., changing the diatonic major IV to the parallel minor's iv); and *harmonic mixture*, in which chord roots themselves are altered (such as ♭VI replacing vi in a major key).¹²

¹¹ This is the source of despair for the student described in this colloquy's introduction. It should also be noted that neither the chorale's claim as a primary vehicle for contemplating harmony's abstractions, nor even the primacy of harmony itself as a topic of instruction, should be taken for granted; see the contributions by Marcelle Pierson and Katherine Pukinskis to this colloquy.

¹² See Laitz (2012, 420–25). Laitz's distinction is similar to what Aldwell, Schachter, & Cadwallader (2011, 435–47) describe as “Simple” and “Secondary” mixture.

Much of the song, however, can also be read in terms of pan-triadic Neo-Riemannian operations. Example 5 represents the tonal structure of the first part of the song, as represented by several canonical transformations. After bouncing back and forth between the Parallel (P) major and minor, the song modulates to C-flat major: the Relative (R) major of A-flat minor. “Schwanengesang” then returns to the major tonic via an RP transformation, before shifting into a more diatonic mode as it tonicizes E \flat . Here, then, the tonal plan *itself* can be explained in terms of pan-triadic relationships. From this case study, students can see and hear how parsimonious voice-leading relationships can occur across entire pieces of music—a global level of analytical insight less often offered by traditional instruction in chorale-style part writing.

	m.	1	2 - 4	5 - 6	7 - 8	9 - 10	11 - 13
mode	A \flat +	i	I	i	\flat III	I	V
mixture							
NRT		A \flat -	\xrightarrow{P} A \flat +	\xrightarrow{P} A \flat -	\xrightarrow{R} C \flat +	\xrightarrow{RP} A \flat +	\xrightarrow{D} E \flat +

Example 5

Neo-Riemannian operations in Franz Schubert, “Schwanengesang,”
D. 744, mm. 1–13 (See also Clark 2016).

The same example can also be used as an ear-training exercise, in which students are taught how to follow a single essential pitch class throughout the entire song, or part of a song. In the case of “Schwanengesang,” I ask my students to track whether a given harmony employs C \flat and C \natural . This approach resonates with the listening/singing exercises described by Daniel Stevens, which ask students to sing simple, slow-moving “guide-tone” lines as an aid to harmonic dictation.¹³ Rather than singing “do” and “ti” in order to differentiate between tonic and dominant (among other harmonies), as Stevens prescribes, Example 6 asks them to sing the two different forms of the third scale degree: the natural 3 and \flat 3. This not only requires them to hear and harmonize with the two different modal inflections of the tonic chord that appear throughout the song (represented by the Neo-Riemannian P transformation), but also to track the tonicization of \flat III, which first emerges as an R transformation in m. 7 and returns

¹³ See Stevens (2016).

to the tonic as a compound RP in m. 9.¹⁴ From the experience of tracking a single chromatic voice across the entire song, students gain a greater understanding of the structural principles of nineteenth-century chromaticism, as elucidated by Cohn—an alternate syntax (the “second nature” of his book’s title) that organizes harmonies not by their acoustic consonance or diatonic affinity, but by their ability to partake in parsimonious voice leading.¹⁵

Intro Verse 1

m. 1 2 5 6 7 8 9-11 12-13

A^b major: i I i V7 i ^bIII [V7] ^bIII I [V7] V

Verse 2 Coda

m. 14 15 16 17 18 19 20 21 22-23

i V7 i [V7] ^bIII I V I V i I V7 I

Example 6

Following C and C-flat in Schubert, “Schwanengesang,” D. 744.

¹⁴ For an added challenge, instructors can ask students to sing the filled noteheads as well. Measures 8 through 13 are particularly challenging and rewarding!

¹⁵ This activity also mirrors an exercise proposed by Riemann himself, who mentions that students could be asked to imagine or perform a single pitch in all six of its possible major and minor triad contexts—a PLR cycle which would produce one of the honeycomb cells on the “chicken-wire torus” pictured in Example 8b. See “Ideas for a Study ‘On the Imagination of Tone’” (1916), trans. Wason and Marvin (1992, 86–88).

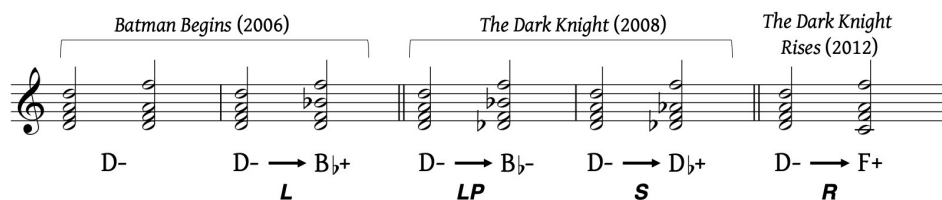
Extensions and Applications: Visual Representations and Film Music

At this point, my sample curriculum (see Table 1, above) opens up into numerous possibilities. Just as scholars have taken many approaches to Neo-Riemannian theory and its precursors and offshoots over the past thirty years, so too can instructors choose to emphasize or de-emphasize different aspects of the theory based on their own teaching style, the interests of their students, or the amount of space available in the curriculum. After an introduction to the canonical “PLR group” of transformations, for example, instructors may decide to include transformations such as “SLIDE” and the hexatonic pole.¹⁶ They may decide to expand into seventh chords, or they may decide to emphasize the historical or intellectual underpinnings of the theory by historicizing the term *Leittonwechsel* or engaging with the issue of harmonic dualism, or they may even emphasize the mathematical elements of Neo-Riemannian theory. In the final section of this essay, I will detail two of the paths that I take, based on my own interests: visual representations of voice leading, and Neo-Riemannian theory in both the analysis and composition of film soundtracks.

Neo-Riemannian theory offers the opportunity to incorporate new repertoires into the undergraduate core curriculum—not only the highly chromatic nineteenth-century music originally addressed by the theory, but also popular music, film music, jazz, and other styles. I like to use it as a springboard to film music. For instance: Example 7, which adapts a diagram from Frank Lehman’s *Hollywood Harmony* (2018), demonstrates how the simple minor-third motive from Hans Zimmer’s score for Christopher Nolan’s *Batman* trilogy is re-contextualized in various ways. The motive takes on new harmonic shades in each film, from our hero’s first emergence on the streets of Gotham City (an L transformation, leading from D- to a B \flat + that Mark Richards [2012] calls “heroic”), to his moral compromises and failures (a tragic sounding B \flat -), to his eventual triumph at the end of the trilogy.

In the later parts of the NRT unit, I also introduce my students to alternate visualizations of tonal space, and demonstrate how various diagrams can be used as analytical tools. Neo-Riemannian theory lends itself to compelling visual analyses, which students can use as they listen to music, and which they often enjoy producing themselves. Diagrams—whether of established musical spaces like the *Tonnetz*, or custom-made network analyses—can serve as listening aids, helping students to understand and track the affinities produced by parsimonious voice leading. Approaching these progressions from both auditory and visual angles helps to make

¹⁶ On SLIDE, see Lewin (1987); and Lehman (2014, 61–100). On H, see Cohn (2011, 31–32 and 106–09).



Example 7

Harmonizations of the “Dark Knight” motive in Hans Zimmer’s *Batman* scores (2006–12); adapted from Lehman (2018, 131).¹⁷

them more accessible and exciting for students, and can reveal new insights about compositional structures.¹⁸

Example 8a depicts a prominent chord progression from the beginning of Hans Zimmer’s score for *Inception* (2010)—a set of chords that received a great deal of attention on the SMT-TALK mailing list when the movie first came out.¹⁹ My interpretation, presents the passage as two sets of four chords each, related to one other by a single SLIDE transformation. Representing this music on the Tonnetz’s geometric dual, the “chicken wire torus” (as shown in Example 8b), demonstrates how visual diagrams can serve as a shorthand in Neo-Riemannian analysis.²⁰ The passage is revealed to be constructed from two iterations of the same sequence of transformations: S, RP, PL, and H.²¹ These two chord loops appear on the diagram as the same shape—one red, and one blue—that are connected in the middle by a SLIDE. The visual representation helps to underscore that the “idealized” voice-leading is the same, even if the two halves of the excerpt are voiced differently and have a different bass line.²²

¹⁷ Lehman’s original diagram includes compound interpretations of some transformations (for example, S = LPR), supporting the argument that the transformations throughout the film series are not only increasingly dramatic, but that they enact an additive process, with each one building on the last. Lehman (2018, 131).

¹⁸ Analysis through voice leading diagrams can also open up a discussion about how theories and visual representations can shape our experiences, and especially our interpretations; see Clark (2017).

¹⁹ This discussion was launched by Stephen Taylor on August 10, 2010, and continued for several days afterward.

²⁰ On the chicken-wire torus, see Douthett and Steinbach (1998, 246–49).

²¹ For a comprehensive lexicon of triadic transformations, see Lehman (2018, 93–94).

²² The notation of this excerpt also raises the issue of enharmonicism in NRT—one of the issues that originally motivated the theory; see Cohn (1996, 9–11). The fourth chord of the excerpt might be more simply notated as C \flat major rather than B major. In my lessons, and the transcription in this pa-

From these examples, students learn how film composers have used NRT's pan-triadic syntax to score minimal motives with creative harmonies; the theory is revealed to be a way of generating ideas about how a given interval or melodic line might be harmonized, and a model for their own compositions—another practical way of teaching students the many possibilities of close voice leading. As an extension of this lesson, in fact, I ask my students to write short scores for a silent film clip of their choice. While they do not have to use triadic transformations for this, many do, particularly when they choose to compose for sequences like the ethereal underwater observation port from *20,000 Leagues Under the Sea* (1916), or a suspenseful sequence from *Nosferatu* (1922). As they compose their scores, they draw on the compositional techniques learned in the unit, such as cycles of paired transformations; repeated transformational shapes as compositional building blocks; and reharmonizing simple motives with new, transformationally-related harmonies.

A unit on Neo-Riemannian theory can be invigorating for students, as it offers them new ways of thinking about chromatic music and of reinterpreting other frequently taught topics such as modal mixture through the lens of chromatic voice leading. Both the theory and the music it is most often paired with appeal directly to students: one of my students recently referred to Neo-Riemannian theory as “music theory cheat codes”—a way of looking at triads that made sense to him in a way that diatonic arrangements often did not. Neo-Riemannian theory relies heavily on the movement of individual voices, but its use in the classroom is not just to reinforce voice leading for its own sake, but to demonstrate how careful attention to the passage between notes and chords can be used to great musical effect.

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