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David Geary

Robert Komaniecki

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Post-Tonal Solmization for Post-Tonal Aural Skills: Implementing Ordered Pitch-Class Intervals

DAVID GEARY AND ROBERT KOMANIECKI

Scholarship regarding solmization systems is largely limited to tonal methods. The present article extends the discussion to post-tonal aural skills, citing the need for a separate, interval-based methodology that fulfills the same functional role for atonal repertoire as scale-degree numbers and moveable-do syllables achieve for tonal music. In Part I, we examine a tonal and atonal aural skills example as a means of justification for separate solmization methodologies. In Part II, we present an effective way to introduce our preferred system, ordered pitch-class intervals, in the classroom, as well as cite additional repertoire and teaching strategies that demonstrate the utility of adopting the new musical orientation. Finally, in Part III, we outline a sample curriculum for a 15-week undergraduate class and describe how to smoothly transition from tonal to atonal studies. The result is a repertoire- and skills-focused post-tonal aural skills course that equips undergraduates to more successfully understand and perform post-tonal compositions.



While debates about solmization systems have been robust for some time, they nearly always center around tonal repertoire.¹ Each of the mainstay methodologies—fixed *do*, moveable *do*, and scale-degree numbers—have their own advantages and disadvantages. Despite an ongoing discussion on the merits of each tonal system, there has been considerably less scholarship regarding atonal solmization. Selecting tools and tactics for the post-tonal aural skills classroom poses new questions and challenges for us as music theory pedagogues.² Elizabeth West Marvin neatly summarizes the conundrum:

To what extent, then, does our perception of non-tonal materials rely on ‘default’ techniques for tonal perception? Should aural skills curricula for non-tonal music build upon groundwork laid in tonal training (on ‘altered’ scales, scale-degrees, harmonies) or should they assume a completely separate atonal sound world?³

Teachers are tasked with deciding between three methodological paths, none of which perfectly addresses every difficulty one will encounter in a post-tonal aural skills class. The first option is to cling to tonal techniques learned in earlier semesters of study, despite the obvious theoretical incongruity with atonal repertoire. This approach may be appealing if

¹ For a few examples, see Karpinski (2000), especially 57–58 and 166–69; Marvin (1995); Lake (1993); and Smith (1991).

² Though not specifically about solmization, Alegant (2018) discusses post-tonal aural skills more generally.

³ Marvin (1987).

students spend limited time with post-tonal music, where the energy spent learning a new system would outweigh the pedagogical gains. Second, a professor can instruct students to sing atonal repertoire using a neutral syllable (such as “la”). Fixed *do* also fits into this category, since it is not an explicitly functional tonal system like moveable *do* or scale-degree numbers. While this method avoids the problem of incorrectly applying tonal techniques to non-tonal music, its neutrality implies that atonal repertoire is free of any organizational principles—something we know to be untrue. Finally, instructors have a third option: introducing a new solmization system aimed towards helping students interact with twentieth-century works in a way that is specific to the musical idiom. It is this third option, and the act of implementing it in the classroom, that motivated us to write this article.

Although none of these approaches is free of pitfalls, we believe that implementing an interval-based solmization system—in our case, ordered pitch-class intervals (OPCIs)—into the aural skills classroom is necessary in order to give students a methodology that matches the music’s compositional grammar, aids performance, and begets musically-relevant analytical insights. In Part I of this article, we discuss a tonal and atonal aural skills example as a means of justification for separate solmization systems. In Part II, we present an effective way to introduce ordered pitch-class intervals in the classroom, as well as cite additional repertoire and teaching strategies that demonstrate the utility of adopting the new musical orientation. Finally, in Part III, we outline a sample curriculum for a fifteen-week undergraduate class and describe how to smoothly transition from tonal to atonal studies. The result is a repertoire- and skills-focused post-tonal aural skills course that equips undergraduates to more successfully understand and perform post-tonal compositions.

Part I: When (not) to Use Tonal Solmization

A solmization system is more than simply a collection of phonemes assigned to certain pitches. It is a mode of communication. When an instructor implements a methodology, they are teaching students a specific way to engage with music—one that is ideally well-suited for the repertoire at hand and draws attention to certain characteristics that the instructor deems important or relevant. In short, the solmization system should fulfill the analytical goals described by Michael Rogers:

The real goal of tonal sight-singing is not just accuracy; it is to hear the music in a particular way—a way that is musically nuanced, that is shaped and directed by goals, and a way that respects the encoded tensions and internal-movement proclivities of the specific environment.⁴

⁴ Rogers (2004), 149.

Rogers challenges a prevailing notion in aural skills classrooms: He suggests that accuracy should not be the sole objective of sightsinging, or even the primary one. The responsibility of ensuring that students conceptualize music in a way that “respects the encoded tensions” of a given excerpt falls squarely on the shoulders of aural skills instructors. Figure 1 below is an excerpt from the second movement of Clara Schumann’s Piano Trio in G Minor, Op. 17. If tasked with teaching this passage using a “musically nuanced” system, a professor would undoubtedly encourage students to sing with a tonal solmization method, perhaps scale-degree numbers. The Romantic melody begins in B \flat major and features a distinct and straightforward tonicization of the mediant. A logical question for students would be to identify a good place to switch tonal centers, most likely choosing m. 7 as the best pivot point. As a result, the syllables performed by the students communicate something concrete about the piece, signaling a modulation to D minor partway through the second phrase.



Figure 1

Clara Schumann, Piano Trio in G Minor, Op. 17, Movement II, mm. 1–10, Violin Melody.

Of course, nearly all aural skills pedagogues encourage their students to sing with one of the common tonal solmization systems when performing tonal repertoire—the method matches the music. It seems to follow logically, then, that we should expect our students to engage with post-tonal repertoire in a similar way, by using a method that is tailored to the style and gives students analytical tools to better understand and perform the music. This perspective, unfortunately, is less unanimous within the theory community.⁵ Students enter the post-tonal aural skills classroom

⁵ An earlier version of this paper was presented at the inaugural “Pedagogy Into Practice” conference in June 2017, where both other presentations and a thoughtful discussion during our Q&A highlighted some of the different perspectives regarding post-tonal aural skills. These and other scholarly interactions make clear that tonal, “neutral,” and post-tonal solmization systems are currently used at institutions throughout the country.

with finely-tuned tonal skills, and relying upon this training often leads to more immediate success performing atonal melodies. The same can be said about singing on a neutral syllable or with fixed *do*. However, when considering that, as Rogers states, a solmization system should afford a stylistically-relevant orientation in addition to aiding performance, it seems that these options emphasizes the latter at the expense of the former.

To further illustrate the need for a methodological alternative, consider the opening of Arnold Schoenberg's String Quartet No. 4, Op. 37. Shown in Figure 2, these six measures are a mainstay in the written theory classroom. The piece is decidedly atonal—dodecaphonic, in fact—and exhibits a variety of compositional techniques that exemplify its serial construction. For example, the fact that the accompanimental trichords in the bottom three instruments complement the discrete trichords unfolding in the first violin melody is recited annually by many post-tonal theory professors. A central point for Op. 37—and, indeed, post-tonal analysis in general—is that it is composed under a set of precepts that are definitively *not* tonal. It would be an exercise in absurdity to imagine teaching the excerpt in the written theory classroom using language or analytical systems taken from a student's past with tonal analysis. Terms such as tonic expansion, dominant prolongation, and harmonic progression are at least heavily problematized and at most nullified by Schoenberg's compositional grammar.

Allegro molto; Energico
♩=152

Violin I
Violin II
Viola
Violoncello

Figure 2

Schoenberg, String Quartet No. 4, Op. 37, Movement I, mm. 1–6.

The opening of Op. 37 is also a popular excerpt for the post-tonal aural skills classroom. Imagine, then, how a student may approach sightsinging the violin melody in Figure 2. Navigating Schoenberg's row with a tonal system, such as scale-degree

numbers, they could attempt singing the passage in the key of D minor because of the opening five notes. Maintaining a single tonal center becomes difficult, though, in mm. 2–3, and modulating to one or more keys through the remainder of the phrase may be preferable. Another possibility is to perform using a neutral syllable, where students can alternate between conceptualizing some pitch adjacencies intervallically and others tonally.

In short, both of these approaches can lead to successful performances—though not without effort. However, they also hamstring a student’s education with respect to achieving a deeper understanding of the compositional grammar at play in post-tonal music. For example, thinking of Schoenberg’s famous twelve-tone row as a series of intervals borrowed from tonal contexts neglects the piece’s explicit *lack* of tonality. The pedagogical call-to-arms in Rogers’s quote referenced above applies equally as well to post-tonal aural skills as it does to its original tonal context. Although allowing students to conceptualize atonal music with tonal conventions may facilitate greater *immediate* accuracy, it ignores the broader goal of instilling a musical sensitivity that extends beyond one’s ability to vocally perform melodies. If we are to take Rogers’s claim seriously, our teaching strategies must accommodate the compositional conventions of the music at hand.

Additionally, stylistically-sensitive singing techniques create better correspondence between the written and aural skills classrooms. Many students study atonal analysis and aural skills as two separate, but concurrent courses. It would make sense, then, for classes that teach the same repertoire to implement mutually reinforcing techniques. In the following section, we detail a method of intervallic atonal solmization—one that we have found fits a variety of non-tonal repertoire, is easily-learned by students, and, most importantly, works with our colleagues in written theory classrooms, rather than against them.

Part II: Intervallic Sightsinging

With the need for an atonal solmization system firmly established, two questions emerge: What interval-based sightsinging methodology is best suited for the aural skills setting and how should it be introduced in the classroom? Instead of first detailing our preferred method—ordered pitch-class intervals—then describing its implementation, this section unfolds from the student’s point of view. We proceed chronologically through a series of activities that can be used in a single class, which quickly and effectively expose students to the new, atonal musical orientation. The

section concludes with a few additional classroom activities and repertoire examples.

When introducing any new concept, it is important that students understand how and why it is relevant to them as developing musicians. Taught poorly, intervals are an acontextual obligatory starting point of the aural skills sequence where students learn to produce and identify intervals on command, only to be quickly tossed aside in favor of learning a tonal solmization system that will serve them for the next few semesters. For atonal repertoire, however, intervals are elevated to a functional role that is in many ways analogous to scale-degree numbers in tonal pieces. We begin our introduction with a brief classroom discussion comparing scale degrees and intervals, where students are guided towards specifying precisely what is communicated with each system. At their core, scale-degree numbers describe the chroma location of a note in relationship to a tonic. Alternatively, an interval is not an agential quality attached to any specific note. Instead, as articulated in David Lewin's famous Figure 0.1 and accompanying commentary in *Generalized Musical Intervals and Transformations*, it expresses the dynamic relationship *between* them.⁶ As opposed to experiencing the ebb and flow of pitches in a tonal context, we encourage students to experience the change and continuity of intervals as a meaningful way to interact with this new body of repertoire.

In order to further demonstrate the distinction, the abstract discussion is followed immediately with a musical example that compares the two systems. Interpreting a single excerpt through a tonal and post-tonal lens illustrates how the different methodologies lead to very different musical observations. We ask students to analyze the first six measures of Bartók's *Concerto for Orchestra* with both scale degrees and intervals, and they sing the melody using both methods. Figure 3 shows the relevant excerpt with both sightsinging syllables. Students first perform the example tonally in F# minor. The initial C# is treated as a dominant with a forward-driving tendency that resolves in m. 2. Then, the leap up to B regains energy and the melody works its way back towards tonic in m. 5. Concluding on C#, the passage ends in the same agitated state that it began.

Alternatively, the intervals of the melody are expressed as the number of half steps between every pair of notes. Singing the melody with these numbers, the use of only perfect fourths and whole steps becomes apparent—an observation that is not analytically emphasized or relevant with scale degrees. This affords a range of different insights to emerge. For example, from a phenomenological standpoint, the first two intervals are ascending perfect fourths, allowing an attentive listener to

⁶ Lewin (2007), xxxi.

anticipate the pattern's continuation. Once the whole step is introduced, though, the two intervals become the new expectation for successive musical events. This orientation is confirmed in the two low-string passages that follow—mm. 12–16 and 22–29. Figure 4 shows the earlier of the two instances, where the addition of a single note mid-phrase has a very different impact on the rest of the passage depending on whether we adopt a tonal or post-tonal lens. In F# minor, the added note results in all of the successive pitches having different relationships to the governing tonality—especially concluding on $\hat{1}$ instead of $\hat{5}$. With intervals, however, the added E stretches the opening chain of ascending perfect fourths by a single note, but the remaining intervals and contour remain the same! Herein lies the distinction: With scale degrees, the added pitch results in a new function for every ensuing note; with intervals, the additional E does not alter the function of the end of the phrase. Between the abstract classroom discussion, excerpt analysis, and singing, students understand the value and relevance of learning an intervallic solmization system.

Scale Degrees
in F#Minor: $\hat{5}$ $\hat{1}$ $\hat{4}$ $\hat{3}$ $\hat{7}$ $\hat{1}$ $\hat{5}$

Number of
Half Steps: 5 5 2 5 2 5

Figure 3
Bartók, *Concerto for Orchestra*, Movement I, mm. 1–6.

Scale Degrees
in F#Minor: $\hat{5}$ $\hat{1}$ $\hat{4}$ $\hat{7}$ $\hat{6}$ $\hat{3}$ $\hat{4}$ $\hat{1}$

Number of
Half Steps: 5 5 5 2 5 2 5

Figure 4
Bartók, *Concerto for Orchestra*, Movement I, mm. 12–16.

In the same class as the Bartók activity, we introduce students to the intervallic solmization system that they will use for the rest of the semester: ordered pitch-class intervals. This system is one of four possible interval labels described in Chapter 1 of Joseph Straus's *Introduction to Post-Tonal Theory*. His Example 1-17 is reproduced here as Figure 5.⁷ We chose ordered pitch-class intervals because we believe it strikes

⁷ Straus (2016), 13.

the best balance between how students typically think about intervals and how we want them to think about intervals. Two factors motivated our decision. First, a system that preserves octave equivalence was a high priority. Operating in pitch-class space (as opposed to pitch space) maintains continuity with students' tonal studies—whether they use scale degrees, movable *do*, or fixed *do*. Second, a methodology with a one-to-one mapping between intervals within an octave and syllables is preferable to a many-to-one alternative, such as interval-class numbers. This way, intervals such as major seconds (OPCI 2) and minor sevenths (OPCI 10) remain categorically distinct, as opposed to their identical interval-class designation of IC 2. Maintaining the distinction has practical classroom benefits, as well: Imagine asking a group of students to sing an ascending “3” and hearing half the class produce a minor third and the other half sing a major sixth. We conclude our introduction to ordered pitch-class intervals by completing the OPCI designations for all of the intervals within an octave. To make it more challenging, we sing intervals in a random order (P4, m2, M6) instead of proceeding up by half step (m2, M2, m3). The final result is shown in Figure 6.



Ordered Pitch Interval:	+19
Unordered Pitch Interval:	19
Ordered Pitch-Class Interval:	7
Unordered Pitch-Class Interval:	5

Figure 5

Example 1-17 from Straus's *Introduction to Post-Tonal Theory*.

While we teach all of the OPCI numbers upfront, we implement the intervals musically in four stages throughout the semester. The order is summarized in Figure 7. Group I begins with half steps (OPCI 1), whole steps (OPCI 2), perfect fourths (OPCI 5), perfect fifths (OPCI 7), and octaves (OPCI 0). Group II adds minor thirds (OPCI 3), major thirds (OPCI 4), and tritones (OPCI 6). Group III adds minor sixths (OPCI 8) and major sixths (OPCI 9). Completing the collection, Group IV adds minor sevenths (OPCI 10) and major sevenths (OPCI 11, sung as the single syllable “lev”).⁸ Each group includes both ascending and descending intervals. This format strives to give students time to become familiar with the new musical orientation by singing, dictating, and analyzing music with easier intervals before progressing to ones that

⁸ This format of gradually introducing intervals is the same as Edlund (1967).

Interval = OPCI	
Unison	0
m2	1
M2	2
m3	3
M3	4
P4	5
A4/d5	6
P5	7
m6	8
M6	9
m7	10
M7	11

Figure 6

Generic Intervals and their Corresponding Ordered Pitch-Class Intervals

Generic Interval	OPCI
Group I	
m2	1
M2	2
P4	5
P5	7
Octave	0
Group II	
m3	3
M3	4
A4/d5	6
Group III	
m6	8
M6	9
Group IV	
m7	10
M7	11

Figure 7

Four Groups of Ordered Pitch-Class Intervals

are more challenging. At every point of the semester, we encourage students to use their awareness of what intervals are “permissible” as a helpful filter for various classroom activities. We have found that it assists students make associations faster between the OPCIs and the more familiar interval labels.

Before progressing to musical examples and other classroom activities, it is worth mentioning how *not* to introduce this methodology. It may be tempting to have students sing major and minor scales while using OPCIs as a familiar context to begin working with the new system. This strategy, however, contradicts the larger goal of using an intervallic approach. Ordered pitch-class intervals are solmization syllables to help engage post-tonal repertoire in a way that fits the compositional grammar. Using OPCIs to sing diatonic scales or tonal repertoire is at odds with the goal of the methodology. However, this does not mean that all scales should be avoided. In fact, many students find it easier to sing whole-tone and octatonic collections when they think intervallically. In the case of an octatonic scale, for example, alternating OPCI numbers one and two is easier than mapping inflected scale degrees for many individuals. That being said, octatonic and whole-tone collections show up in both pitch-centric and non-pitch-centric repertoire. Addressed in greater detail later in the article, performing excerpts by Bartók, Debussy, and Rimsky-Korsakov reinforce the musical reality that twentieth-century pieces cannot always be neatly labelled

as either tonal or atonal. In these cases, sometimes using an extended-tonality technique is more effective while other times adopting an intervallic approach is more appropriate. The goal in our post-tonal aural skills class is to equip students with both sets of tools and empower them to determine for themselves which method is more beneficial. This does not mean that a piece or excerpt can have only one correct interpretation. It means that students choose an analytical mode when engaging with music and that they are aware of the implications of their decision.

The following two examples underscore the performative and analytical benefits of adopting ordered pitch-class intervals. The first, Lili Boulanger's "D'un Vieux Jardin," written in 1914, is from early in our atonal studies. Figure 8 shows the right-hand melody in mm. 22-30. With thirty of the thirty-two intervals as even OPC numbers, it is an ideal whole-tone example for the classroom. For many students, the pervasiveness of whole steps, twenty-three of the intervals, makes singing this piece with OPC numbers easier than with scale-degree numbers.⁹ Performing with intervals also has analytical benefits. The scarcity of half steps draws attention to when the melody shifts from one whole-tone collection to the other. Any excerpt constructed with a single whole-tone collection uses only even intervals. In "D'un Vieux Jardin," therefore, students can be aware that the two times they sing an odd number, they are switching between the two whole-tone collections. Treating even intervals as an agent of continuity and odd intervals as one of change elevates intervals to a functional role that is indispensable for engaging the work in a stylistically-appropriate manner. While this analytical observation is fairly accessible to students without the need for OPCs, using an intervallic system has analysis emerge *through* performance as opposed to treating it as a separate afterthought. The analytical insights are built into the solmization syllables.

The second example is from later in the semester during our twelve-tone module, after students have been exposed to all the intervals. With the increasingly challenging post-tonal repertoire, the ordered pitch-class intervals reveal more compositional features that are less apparent on the musical surface. Schoenberg's Op. 27, No. 1 is a serial choral piece primed for the aural skills classroom. As a four-part *a cappella* work, it is meant to be sung despite its difficulty. While we spend time diligently performing

⁹ Throughout the semester, our students perform both prepared and unprepared atonal melodies. The majority of homework assignments and hearing materials are prepared, and students are required to perform with OPCs. For ungraded sightreading activities in class, students are given time to analyze passages before performing. For graded sightreading activities, students are allowed to choose their solmization system (though we have found that students are often more successful when performing with OPCs than without).

Figure 8

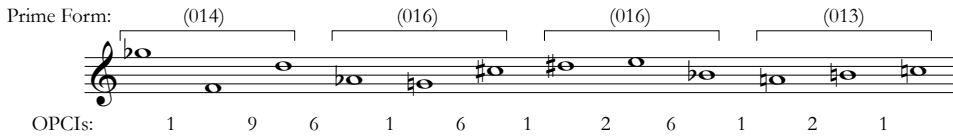
Lili Boulanger, *Trois Morceaux Pour Piano*, “D’un Vieux Jardin,” mm. 22–30.

excerpts from the work, we recognize that a perfect classroom performance of the whole piece is not the desired end goal. The goal—reiterating the overarching learning objective of our post-tonal studies—is for students to think intervallically about music when it is appropriate, in order to both aid performance and yield valuable musical insights.

Much of our class time focuses on the opening eight measures of the soprano line. Students dictate the opening row iteration as a 12-note pitch pattern. Provided with the first and seventh notes, their task is to notate the remaining pitches, write the OPCIs, and label the prime form of the discrete trichords. The result is shown in Figure 9. Once completed, students sing the example while tracing the contour with their hands. This leads to a classroom discussion where we identify interesting features that emerged from what they have written down and performed. Students are quick to recognize that the row emphasizes half steps and tritones, the interior trichords share the same prime form (016), and those trichords are related by inversion.¹⁰ All of these attributes are aurally tangible features that continue throughout the piece. Students can use them as concrete listening strategies or as the basis for making performance decisions.

Next, we turn the pitch-pattern dictation into a contextual listening activity. Students are asked to do two things. The first objective is to listen to the opening of the piece and identify the pitch transformation of the soprano’s second row iteration.

¹⁰ Part of our third and final unit focuses on singing, notating, and aurally identifying the four types of pitch transformations—transposition, inversion, retrograde, and retrograde inversion. Ordered pitch-class intervals help students with these tasks by, again, encouraging them to think of melodies and motivic cells as a succession of intervals, not pitches. We treat these operations in pitch space, instead of pitch-class space, for simplicity and time constraints. As a result, we use repertoire and acontextual examples in class that preserve contour between successive iterations of a motive or row. Students learn rules for how to transform a motive: transposition preserves the order and contour of the intervals; inversion preserves the order and switches the contour of the intervals; retrograde switches the order and contour of the intervals; and retrograde inversion switches the order and

Prime Form: 

OPCIs: 1 9 6 1 6 1 2 6 1 2 1

Figure 9
Opening Row of Schoenberg Op. 27, No. 1.

After visually tracking alongside their dictation for the initial row presentation, many students are able to identify the ensuing retrograde transformation on the first listening by retracing their notated pitches. At this point, we project the soprano melody and sing it—see Figure 10. The students' second task is to aurally identify the opening row iteration of the remaining three voices. The alto is an inversion of the opening row, identifiable by the characteristically recognizable ascending minor ninth; the tenor transposes the soprano melody down an octave; and the bass transposes the alto melody down an octave, which is another inversion. Labelling the points of imitation draws attention to the global form of Op. 27, No. 1. The bulk of the piece is a four-part canon. The melody is four rows long; the soprano and tenor are identical and alternate entrances with the inversionally-related alto and bass parts.

Durchaus kräftig in Tempo und Tongebung

$\text{♩} = 120$



Tap-fe-re sind sol - che, die Ta - ten voll brin - gen, an die ihr Mut, nicht her-an-reicht.

6
Sie be - sit - zen nur die Kraft, den Auf - trag zu kon - zi - pie -

Figure 10
Soprano Part of Schoenberg's Op. 27, No. 1, mm. 1–8.

To return to an earlier point, navigating this music with a tonal system may be tempting for immediate performance success. This strategy, however, tells us nothing about the compositional grammar and, in fact, it looks past key aspects of the musical structure. For example, in Figure 10, the C#–D#–E in mm. 2–3 is one of the few successions of notes that fit comfortably in a tonal context—either in C# minor or E major. However, is this how we as music theory pedagogues want our students to

preserves the contour of the intervals.

think about twelve-tone music—using a system that directs attention towards vague tonal implications at the expense of other stylistically-appropriate features? In this instance, using scale degrees draws attention away from an important structural aspect of the row only for the sake of correctly singing an ascending whole step and half step. Grouping C#, D#, and E together stretches across the boundaries of the interior (016) trichords, contradicting a musically-relevant feature of the row.

Including Op. 27, No. 1, we have seven lectures entirely dedicated to dictating, singing, and listening to seven different serial pieces. By the end of the unit, students have improved generalizable skills applicable to post-tonal repertoire, developed concrete strategies for approaching dodecaphonic works, and engaged in deep learning with canonical repertoire from the twentieth century. We have been encouraged by students' positive reactions to these repertoire-driven lessons, as they learn new ways to perform and listen to post-tonal music. Becoming conversant with an intervallic solmization system works towards reshaping their orientation regarding a less-familiar body of repertoire.

While emphasizing repertoire in the classroom is a top priority, we also regularly include acontextual exercises to help students gain familiarity with ordered pitch-class intervals. It is common to have students learn intervals in a tonal context by referencing familiar tunes, such as Brahms's "Lullaby" for ascending minor thirds and "Maria" from West Side Story for ascending tritones. Although this is a helpful starting point, it maintains a reliance on tonal principles by associating one pair of scale degrees with any given interval, when in fact many scale-degree pairings are possible." Lars Edlund, in his *Modus Novus: Studies in Atonal Melodies*, also laments that this approach is really only effective for singing and aurally identifying individual intervals as opposed to engaging with longer musical passages:

Great accuracy in singing individual intervals is not always a guarantee of accuracy in *reading atonal melodies*. ... From a point of view of sight reading training, therefore, the most important thing now is to practice *combinations of intervals* that will break the bonds of the major/minor interpretation of each individual interval.¹¹

We created two warm-up activities to help students achieve fluency in stringing together multiple intervals. The first is similar to tonal "echo" patterns, but with atonal collections. Figure 11 shows one example with two methods of delivery. Shown in Figure 11a, the teacher sings a short motive on a neutral syllable or plays it at the piano. Students respond by singing the melody on ordered pitch-class intervals. Depending on the students' skill level, an intermediary step can be added where they

¹¹ Edlund (1967), 13.

first respond by singing the pattern on a neutral syllable before performing with the syllables. This gives them additional time to translate the pattern. Once students become more familiar with the OPCIs, this step can be eliminated. Figure 11b illustrates a second way to perform the same activity. After providing the starting pitch, either vocally or at the piano, the teacher can trace the contour of the motive with their hand while speaking the ordered pitch-class intervals. Again, students respond by singing on OPCIs. We alternate between the two methods of delivery since they work on related but discrete skills. While both develop interval fluency, one moves from sound to symbol (Figure 11a) and the other moves from symbol to sound (Figure 11b).



Instructor	→	Student
		
Sing on a Neutral Syllable: “La” “La” “La” “La”		Sing on OPCIs: “0” “5” “1” “4”

Figure 11a
Atonal Echoes I.


Instructor	→	Student
Give students starting pitch, then speak “0, 5, 1, 4” while pointing up or down to indicate contour		
		Sing on OPCIs: “0” “5” “1” “4”

Figure 11b
Atonal Echoes II.

Another exercise involves constructing a melody one note at a time, which we call the “Build-A-Melody” activity. The example in Figure 12 can also be performed using the same two methods of delivery as the atonal echoes. The teacher begins by singing one note and the students respond by singing it on OPCI o. (Every melody begins with the first note being sung as “O,” since there is no interval between the first note and what comes before it.) Additional pitches are added one at a time, and the example can be as long as you wish, also making this a great opportunity to further develop musical memory.

The two activities shown in Figures 11 and 12 can be adapted and amended in other ways. For example, we frequently have students complete them in pairs or small groups, where they rotate roles as teacher or student. In many ways, acting as

the teacher is more challenging. The student needs to decide a pattern to sing with various intervals, perform it correctly, and identify whether or not their partners respond accurately. For the “Build-A-Melody” activity, we have also had success going around the room having individuals alternate roles: one student sings the first note on “la,” the next person responds on “o,” the third adds a second pitch, the fourth responds, and so on. Another way to alter this activity is to end by notating whatever pattern or patterns we have sung. This is ideal for linking performance and dictation within a single activity.







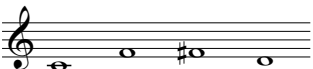

<p>① Instructor</p>  <p>Sing on a Neutral Syllable: “La”</p>	<p>Student</p> <p>→</p>  <p>Sing on OPCIs: “0”</p>
<p>② Instructor</p>  <p>Sing on a Neutral Syllable: “La” “La”</p>	<p>Student</p> <p>→</p>  <p>Sing on OPCIs: “0” “5”</p>
<p>③ Instructor</p>  <p>Sing on a Neutral Syllable: “La” “La” “La”</p>	<p>Student</p> <p>→</p>  <p>Sing on OPCIs: “0” “5” “1”</p>
<p>④ Instructor</p>  <p>Sing on a Neutral Syllable: “La” “La” “La” “La”</p>	<p>Student</p> <p>→</p>  <p>Sing on OPCIs: “0” “5” “1” “4”</p>

Figure 12
Build-A-Melody.

Part III: Curriculum

By this point, the thesis of the preceding sections is hopefully clear: We should hold our students—and therefore ourselves as teachers—to the same level of stylistically-appropriate engagement with music in the post-tonal aural skills classroom as we do in earlier, tonal semesters of study. That being said, the twentieth century has a range of musical styles. It would be disingenuous to only present clear examples of “tonal” and “atonal” music in the classroom, as if all music must fall squarely within one camp or the other. In fact, it is the music that resists such categorization that provides us as aural skills pedagogues with opportunities for challenging and rewarding teaching, and it presents students with puzzling pieces that sometimes have no single “correct” interpretation. Filling in the vast stylistic gap between Schubert and Schoenberg are composers with styles that vary widely, deviating from typical tonality while, simultaneously, not quite exhibiting decidedly atonal techniques associated with the Second Viennese School. Below is a sampling of composers who inhabit this “in-between” space:

- ◆ Anton Bruckner (1824–1896)
- ◆ Antonín Dvořák (1841–1904)
- ◆ Hugo Wolf (1860–1903)
- ◆ Gustav Mahler (1860–1911)
- ◆ Claude Debussy (1862–1918)
- ◆ Richard Strauss (1864–1949)
- ◆ Carl Nielsen (1865–1931)
- ◆ (Non-serial) Arnold Schoenberg (1874–1951)
- ◆ Maurice Ravel (1875–1937)
- ◆ Régine “Poldowski” Wieniawski (1879–1932)
- ◆ Igor Stravinsky (1882–1971)
- ◆ Rebecca Clarke (1886–1979)
- ◆ Nadia Boulanger (1887–1979)
- ◆ Sergei Prokofiev (1891–1953)

Embracing the ill-defined middle zone between tonal and atonal traditions is vital for students to attain a more complete understanding of music from this time period. As a result, we readily incorporate this repertoire in the classroom.

While it is important to expose students to repertoire that operates outside a clear tonal/atonal divide, it is also important to design a class with conceptual continuity and flow. Therefore, our fifteen-week post-tonal aural skills course begins with late tonal techniques, works through the uncategorizable middle zone during weeks 6–10, and concludes with studying increasingly-difficult atonal and serial pieces. A sample curriculum outline can be seen in Figure 13. This format allows students to begin in the relatively familiar territory of late-Romantic tonality and work towards the often less-familiar realm of atonality. In Unit I, we encourage students to continue using their tonal solmization system, or systems, learned in earlier semesters. In Unit III, students adopt an entirely intervallic approach and perform with OPCIs. In Unit II, the middle zone repertoire, we tell our students that the choice between using a tonal or atonal solmization system is frequently context-dependent. They should strive to become conversant in both methods and be comfortable switching back and forth between the two systems—sometimes even within the same excerpt.

UNIT 1: Weeks 1-5

Pitch	Rhythm	Other	Composers
<ul style="list-style-type: none"> • Advanced Chromaticism • Non-Functional Diatonicism 	<ul style="list-style-type: none"> • Rhythmic Mixture • Polyrythms • Quintuplets/Septuplets 	<ul style="list-style-type: none"> • Sonorities: Identification and Keyboard <ul style="list-style-type: none"> ◦ 9ths, 11ths, 13ths, Quartal, Quintal 	<ul style="list-style-type: none"> • Wolf, Strauss, Wagner, Mahler, Bruckner, Ravel, Beach, Debussy, Poldowski, Clarke

UNIT 2: Weeks 6-10

Pitch	Rhythm	Other	Composers
<ul style="list-style-type: none"> • New Pitch Collections <ul style="list-style-type: none"> ◦ Modes, Pentatonic, Octatonic, Whole-Tone • Atonality I <ul style="list-style-type: none"> ◦ Perfect Intervals, 2nds, 3rds, tritone 	<ul style="list-style-type: none"> • Asymmetrical Meters • Beat-Constant Meter Change • Division-Constant Meter Change 	<ul style="list-style-type: none"> • Pitch Collection Identification 	<ul style="list-style-type: none"> • Bartok, Debussy, Boulanger, Ravel, Stravinsky, Rimsky-Korsakov, V. Williams, Hindemith, early Schoenberg, Ives

UNIT 3: Weeks 11-15

Pitch	Rhythm	Other	Composers
<ul style="list-style-type: none"> • Atonality II <ul style="list-style-type: none"> ◦ Add 6ths, 7ths • Serialism 	<ul style="list-style-type: none"> • Tempo Modulation 	<ul style="list-style-type: none"> • Pitch Transformations: Identification and Singing <ul style="list-style-type: none"> ◦ Transposition, Inversion, Retrograde, Retrograde Inversion 	<ul style="list-style-type: none"> • Gubaidulina, Berg, Webern, Schoenberg, Dallapiccola, Stravinsky

Figure 13
Content Outline for a Fifteen-Week Post-Tonal Aural Skills Course.

An excerpt of Debussy's "Gigues" from *Images pour orchestra* (1905-1912) exemplifies the benefit for students to be proficient alternating between intervallic and tonal thinking. The first line of Figure 14 is a straightforward instance of a partially-realized whole-tone collection. We encourage students to sing this portion using OPCIs, as it is comprised entirely of whole steps (OPCI 2) and skips of a major third (OPCI 4). However, when the melodic line is taken up by the oboe d'amore in mm. 13-19, the previous $G\flat$ is replaced by $G\sharp$. These seven measures can convincingly be conceptualized in F Aeolian, where performing on scale-degree numbers is both easier and communicates more musically-relevant information than the intervallic syllables. Finally, the whole-tone flute melody returns for the concluding five measures and students can shift back to singing OPCI numbers. As an excerpt that oscillates between tonal and non-tonal collections, it makes sense to have a flexible sight-singing method that allows students engage with specific passages in a musically-sensitive way.

The figure shows three staves of musical notation. The first staff is for Flute, starting at measure 10, with a piano (p) dynamic marking. It contains a melodic line with slurs and ties. The second staff is for Oboe d'amore, starting at measure 13, and features a melodic line with triplets. The third staff is for Flute, starting at measure 18, and also features a melodic line with triplets. The key signature is three flats (B-flat, E-flat, A-flat) and the time signature is 2/4.

Figure 14

Debussy, *Image pour orchestra*, "Gigues," mm. 5-35, Modified.

The Debussy excerpt in Figure 14 helps students practice shifting between scale-degree numbers and ordered pitch-class intervals for successive passages within a single melodic line. We also incorporate ensemble music in class where the techniques are performed simultaneously. The opening of Schoenberg's "Schenk mir deinen goldenen Kamm," Op. 2, No. 2, illustrates how different parts of a musical texture can encourage different musical orientations. In order to make the song for piano and voice more accessible in the aural skills classroom, we created an SATB arrangement of the piano accompaniment to support the soprano melody. The five-part realization

is shown in Figure 15.¹² The vocal melody is assigned as homework, and students are prompted to choose which solmization system or systems to use. Typically, they prepare mm. 1–4 of the melody on OPCIs then switch to scale degrees in F# major for the cadence in mm. 5–6.

On the day the assignment is due, we spend time in class learning the remaining accompanimental parts to create a holistic musical experience. Before singing, we analyze each line to determine whether scale degrees, ordered pitch-class intervals, or a combination of the two would be most effective. While individualized answers emerge, the group typically agrees to learn the soprano, alto, and tenor parts on OPCIs and the bass line on scale degrees. The tenor, for example, heavily emphasizes half steps and tritones, making it difficult to maintain a single tonal center for any reasonable span of notes. The bass, however, does have tonal implications that students are quick to identify: mm. 2–4 is a circle-of-fifths progression, and the concluding B \flat is a logical choice for a tonal center. Then, after descending a half step on the downbeat of m. 5, the cadence outlines a tonic triad in F# minor. Students acknowledge that mm. 5–6 have strong tonal implications across all five parts, which typically means applying scale degrees. However, because the parts only use half steps and whole steps, they find it easier to maintain a single orientation throughout instead of switching—unlike the vocal melody during these measures, when the more difficult leaps are easier to navigate tonally.

¹² “Schenk mir deinen goldenen Kamm” is one of many vocal arrangements we have created for our class. In courses that heavily emphasize single-line melodies, students gladly welcome the opportunity to perform challenging and rewarding ensemble music. We strive to choose pieces that, in short, do not require much work to make appropriate for the classroom setting. Chamber and choral music are great resources since they typically do not require any adaptations. For other genres, excerpts that have clearly defined parts and good voice-leading principles are preferable. This includes expanding solo repertoire to ensemble settings when appropriate, such as transforming the piano part of Op. 2, No. 2 into a SATB texture. Looking at the original score, the piano’s chorale-style accompaniment does not require many alterations to suit the vocal setting. The main difference here is omitting doubled notes, such as the doubled Gs on beat 3 of m. 1 and the right-hand octaves in mm. 2–4. Other arrangements may require more artistic flexibility to create appropriate vocal parts.

Sehr langsam

Treble Solo

Soprano

Alto

Tenor

Bass

4

Figure 15

Arrangement of Schoenberg, "Schenk mir deinen goldenen Kamm," Op. 2, No. 2, mm. 1-6.

Conclusion

Designing a twentieth-century musicianship course is no easy feat. The stylistic diversity makes it so two institutions could cover completely different material and both classes could be appropriately labelled “post-tonal.” With such a wide range of possibilities, it is unsurprising that the techniques we use to teach frequently influence the repertoire we bring into the classroom. Without a solmization system to appropriately perform interval-based music, many programs stop short of the Second Viennese tradition in the aural skills setting—concluding, instead, with studying new pitch collections such as the diatonic modes, whole-tone collections, and octatonic scales. While studying techniques and works by Bartók, Rimsky-Korsakov, and Stravinsky are of course a valuable part of the core curriculum, it is not a suitable endpoint for institutions that wish to give students a broader exposure to twentieth-century music. Incorporating ordered pitch-class intervals empowers teachers to find musical ways to expose students to atonality.

It may be tempting, as well, to dismiss the need to include the Second Viennese tradition in aural skills classes since it is frequently taught at length in the written theory setting. In our opinion, this does not send the right message. Recently, a student who had previously completed our post-tonal aural skills class stopped one of us in the hall to share her current experience in the post-tonal analysis class.¹³ Paraphrasing, she said, “I struggled a bit learning to sing with OPCIs in your class but trusted that you were teaching it to us for a reason. Now that I’m in the written post-tonal class, I can’t believe how much I already know because of the interval singing. It is so useful!” When working in tandem with the written theory curriculum, a new, atonal solmization system helps students more readily apply what they learn in the classroom to their work as musicians. Activities such as singing and dictating with OPCIs demand a high level of active participation, requiring students to think of atonal music intervallically in order to be successful. As a result, students will be more likely to return to these ideas and strategies when engaging music after college—which is arguably the universal objective of the undergraduate theory core curriculum.

Again, the most significant impediment to incorporating an intervallic solmization system is the time it takes to do so in an already crowded curriculum. One may ask: With an ever-growing list of what students ought to know upon graduating college

¹³ Currently at Indiana University, students can take the post-tonal aural skills and written theory courses at any point once they complete the necessary prerequisites. They are not required to be taken concurrently.

with a degree in music, does the value of adding another item to the pile outweigh its inconvenience? Our answer turns the question on itself: How important is convenience? Many of the activities undertaken in a typical aural skills classroom are not indicative of the types of things a student will be expected to do upon becoming a professional performer or teacher. For nearly every student that completes a music degree, the ability to sight-sing atonal repertoire pales in comparison to the ability to appropriately conceptualize the compositional techniques at play in twentieth-century music and use that knowledge to make musically-sensitive performance decisions. Any repertoire brought into the classroom should be accompanied by teaching techniques geared towards its musical style.

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