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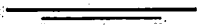

Enhancing Sight-Singing Skills Through Reflective Writing: A New Approach To The Undergraduate Theory Curriculum

Lyle Davidson, Larry Scripp, and Alan Fletcher

Fragments of Lizst's B minor Sonata thunder from under the doors in the piano department, trombones attack their opening solo in Ravel's Bolero over and over, clarinets repeatedly caress the lyrical slow movement of the Brahms E-flat major sonata: knowing-in-action abounds all day long. Teaching and learning at a conservatory are unique and special experiences.

Undergraduate music students begin their training with a high degree of skill and experience in musical performance, but little patience for learning that does not directly involve their instruments. In fact, many students come to a conservatory specifically to avoid 'academic' approaches to learning. Many teachers are quite aware of the difficulty of getting students to think about and broaden their understanding of performance skills. As a result, performance classes and lessons often do not promote learning that is self-directed, enduring, or applicable to diverse contexts in the future. Too infrequently does teaching encourage students to question what, when, how, or for what purpose learning takes place.

A Curriculum Based on Reflective Understanding

Reflecting on what occurs in performance, on one's grasp of skills, and on making connections is closely linked to understanding. How do we construct a pedagogy that provokes reflection and encourages multiple points of view?

What follows is an account of a theory curriculum and faculty committed to addressing this question. This commitment took the form of developing continuous and challenging reading and writing assignments while maintaining strict performance standards. Needless to say, a theory curriculum that stresses reflective writing assignments in tandem with performance skill development represents a departure from traditional approaches.

Many entering students are pleasantly surprised when they discover they will be required to take an intensive course in sight singing as their only theory requirement during their first semester at New England Conservatory. The seeming emphasis on performance skills in a theory class matches their expectations, because it supports their instrumental and vocal practice very well. Imagine their dismay when they find that this beginning solfège course also includes required readings and journal assignments that cover an array of topics not normally associated with musical training and certainly not with solfège: articles on cognitive development, skill acquisition, and reading theory! In addition, each student writes four papers in conjunction with these readings after extensive class discussions.

"We came to a music conservatory, not a liberal arts college!" is a typical first reaction to this curriculum. They need to be persuaded. They are reluctant to purchase the readings, engage in class discussions or write in their journals. However, once the semester is underway, and students are continually encouraged to write about their own skill development, to document, follow, and develop their insights as they progress through the course, they begin to change. By the end of the first semester, these same students may:

- discover how they are learning to sight sing in terms of qualitatively different stages of development;

  If, as Robert Trotter's article 'The Mystery of Mastery' suggests, learners pass through five stages of skills acquisition and facility in their progress towards expertise, these steps must necessarily have their cognates and correspondents in any disciplinary field. In the area of music, the steps are as clear and delineated as in any other discipline, even though the nature of musical production and performance may require that a musician exist simultaneously at multiple levels of expertise (JB, mezzo soprano)

- comment on the changing relationship between solfège skills and instrumental performance;

  I thought Dandelot's Manuel Pratique was merely a book for learning fluency of syllables in different clefs. . . . Later I began to see these exercises as sight reading drills, tools for pattern reading skills, new practice techniques and occasionally as a guide to phrasing. (MS, trumpet)

- argue articulately for connections between language and music reading;

  Schemata [from E.D. Hirsch's view] are necessary for making what we read connect with background knowledge. There are several parallels between integrating schemata in a literary sense and integrating schemata in a musical sense, such as solfège. (JC, pianist)

- and observe learning and demonstrate music reading processes at high levels of proficiency and comprehension.

  The core of solfège lies within the internal thought process. . . . Putting solfège on a musical line . . . serves to identify it for someone else or to further understand it yourself. (CF, flute)

There are more pressing reasons for this approach than to reintroduce students to academic skills. A course where students have to learn new musical skills 'from scratch' offers a unique opportunity for thinking about 'how' and 'for what purpose' one learns. The commitment to reflective writing in the basic skills courses in the New England Conservatory's curriculum has, in turn, supported new levels of understanding of the cognitive nature of basic musical skills. Teachers are more aware of the range of students' understanding, while students, through their own practice and reflective efforts, learn to use and expand their notions of the new performance skills.

Integrating reflective writing into a performance curriculum did not come easily. These changes at New England Conservatory involved developing a rationale based on recent research in education and cognitive psychology, creating vehicles for writing based on language arts research, and looking carefully at examples of student work to analyze, verify, and adjust the results of the approach.

> The educator who helps learners arrive at a more and more critical view of their reality is a knowing subject, face to face with other knowing subjects. He can never be a mere memorizer, but a person constantly readjusting his knowledge, who calls forth knowledge from his students. For him, education is a pedagogy of knowing. (Friere, 1970)[1]

At the New England Conservatory, the basic music reading course, Solfège 1, provides an important opportunity for adult students to learn to read music with 'silent comprehension', i.e., without the use of their instrument. These students may be able to learn music on their instrument from notation, but through this course of study they learn new literacy skills in order to free themselves from rote instruction. For musicians this process can be seemingly redundant and frustrating, analogous to acquiring fluency in a second language (Davidson and Scripp, 1988; Scripp, 1990). It is clear that it demands considerable thoughtfulness on the part of the learner, as well as the instructor. This thoughtfulness is a critical component in effecting change.

Reflective Thinking: Views on Learning from Cognitive Science

Research in cognition places reflective thinking in the foreground of educational theory and practice. In creativity studies, for example, the central role of journal keeping and sketching is clearly evident in the working methods of mature writers, artists, and scientists (John-Steiner, 1985; Perkins, 1989). For creative artists, keeping 'notebooks of the mind' provides a resource for collecting ideas and working out pre-production processes.

> Most composers keep a notebook in which they put down germinal ideas that occur to them. I think composers will tell you that they get ideas when they can't possibly work on them. They put them down where they can find them when they need to look for ideas and they don't come easily. (Copland in John-Steiner p. 152)

What about music theory students? How can we insure that a significant amount of reflective work accompanies the development

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[1]References to the sources cited in this article are given at the end.

of new reading skills? Although a minority of music students study composition, all students need to be equally concerned with reflecting on their work in relation to music reading skills. Knowledge of goals, how they change, and where one stands in relation to them are important for musical development. Evidence for this comes not only from cognitive psychologists, but also from current practices in assessing learning in the arts (Davidson and Scripp, 1990). In cognitive psychology reflective intelligence can be considered a separate and indispensable kind of intelligence. Some writers, for example, emphasize the possibility of 'learnable intelligence' and posit three specific intelligences: neural, experiential, and reflective intelligence.

While some kinds of skills are *neurological* in nature (e.g., skills related to reaction time), *experiential intelligence* depends upon vast periods of time spent finding and solving problems within a particular domain. *Reflective intelligence* provides an arena for developing skills that are not necessarily bound to the context of a set of experiences in a specific domain. Reflective intelligence, metacognitive awareness, and general thinking strategies suggest ways that practitioners and learners monitor their work in ways that enhance development. This becomes even more relevant for musicians when we acknowledge that reflection occurs not only as words, but in graphic representations and also in the context of performance. Metaphors, gestures, and practice strategies all serve to illuminate the work of productive musicians (Davidson, 1989).

Reflective activity makes perhaps the greatest impact in learning. While little can be done to alter oneself neurologically, or make up the critical ten years of experience required for substantial mastery in a domain, considerable change in learning may occur as a result of reflecting about how one learns, redirecting efforts when initial strategies fail, or revising learning goals in the course of acquiring new skills and concepts.

This view of reflective intelligence has specific meaning for musicians. They practice it in a variety of ways. Music students typically begin studies at a very young age, and so are continually refining skills and revisiting literature as they mature. Learning to read music when first fingering an instrument is a very different thing from using notation to interpret a piece of music afresh after

many years of performing experience. In addition to taking private lessons for many years, music students typically engage in continuous dialogue about their work and their development, making recordings of the performances for critique and participating in ensembles that encourage social interactions when reviewing performance experiences and evaluating one's own work. But reflecting on a work by revisiting it perhaps years later is very different from using immediate reflection as a conscious strategy for learning. The cognitive-developmental model of learning that stresses self-directed productivity—composition, improvisation and personal interpretation guided by instruction—is different from a behaviorist or 'cultural transmission' model which stresses learning to perform repertoire by rote (Davidson and Scripp 1989). In a cognitive-developmental model of learning, reflection plays a much larger role.

For cognitive psychologists of music, reflection holds an essential role in the development of cognitive skills. Furthermore, research suggests that, without including reflection in educational practice, musical development may become suspect because of the lack of coordinated cognitive skills expressed through production or perception tasks (Davidson and Scripp 1992). Interpretative skills may be informed by perception, but they rely on reflective thinking to create new levels of meaning. Jeanne Bamberger (1991) for example, finds that untrained children and adults represent familiar tunes 'note by note', whereas more experienced children and adults represent the tune in terms of a configuration within a tonal system. On the other hand, conservatory students who have not coordinated notational skills with performance skills may be surprisingly unable to create or verify notations of simple tunes (like 'Happy Birthday') without the use of a musical instrument (Davidson, Scripp and Welsh 1988).

Tools for Reflective Thinking in Music

Some music educators have recently tried to introduce 'reflection tools' into the ensemble and general music classroom assessment as a major feature of portfolio assessment. Arts PROPEL music classrooms in many states, for example, feature self-reporting projects that stress peer critique, and interviews designed to rein-

vestigate learning over time with teachers, peers, and parents (Davidson and Scripp, 1990; Davidson et al., 1993; Davidson, 1993). In the context of Arts PROPEL portfolios, reflection, along with production and perception, is an essential component of learning that must be documented and assessed over time.

What are the tools for promoting reflective thinking? Three are especially productive in music: questionnaires, journals, and writing about relationships between the reading assignments and their practice sessions. Taken together these tools form the basis for tracing the path of skill development in solfège classes. They reveal the students' perspectives as they emerge from self-assessment, imaginative thinking, and the application of emerging skills.

Questionnaires

At the beginning, middle, and end of the semester questionnaires can be used to give students an opportunity to think about the goals of the course, how these goals will apply to musical life after the course, and opinions about assessing learning in the course, e.g., "Do you think grades in this course should be awarded primarily according to achievement or improvement?"

What is particularly revealing to the student as well as the teacher is the change in how these questions are answered during the two-year program. First-year students typically are more apt to be local in their perspective. In terms of the goals of the course, for example, first-year students typically reply 'to teach students how to sight read music better,' 'to hear or identify intervals accurately,' and to be a 'more marketable musician.' Later on, the perspective is enlarged with responses less likely centering on skills for their own sake, but on skills for changing the process of music learning and standards of understanding in the future. Often the role of the conductor is kept in mind as an end state model:

> To assist us in becoming expert musicians keeping the highest goals in mind, that is the goals of a conductor, that is, not only becoming proficient sight readers but also not treating sightreading as the end, but as the means to the end.... Thus, by practice and by applying it to pieces we can grow musically. (JT, soprano)

Why are questionnaires important? For teachers, the information gained through questionnaires helps document the changing perspectives of the learner. Instruction in skills should not be taught in a vacuum, nor should students miss important opportunities to reflect on their perception of the course and its potential in their future. Also, everyone can learn much from each other's point of view, whether musical novice or expert. For example, a student's answer to the question on class evaluation can influence the whole structure of grading for the class. One student writes:

> Without achievement you cannot have improvement. What I think would be the answer is gearing achievement and improvement on an individual basis. (second-semester student)

Journals

With questionnaires, the process of reflective thinking begins with personal goal statements and opinions. Journals, i.e., reflective writing about class experiences as well as practicing, provide a very different opportunity for reflection. Here, the dialogue that develops between the instructor and the learners can be consistently supported for the benefit of both (Berthoff, 1988). What happens in class as well as in students' individual work outside of class can be summarized in journals to be read and commented on later by the student. Equally important, it can be reviewed by the instructor repeatedly throughout the year as well.

Ann Berthoff, a nationally known consultant on writing, gave our faculty a series of workshops on techniques of journal writing and its integration into the effective teaching of music theory (as distinct from effective teaching of writing). She helped the solfège teachers prepare students to read and write as a natural extension of the course work.

Students learn how to use a journal as an heuristic device to record and guide their thinking. They use a variety of journal strategies: lists, guiding questions, and double-entry notebooks: At the same time, a supportive process has begun in the form of discussions about sight singing based on class experiences. Questions are offered as devices for stimulating journal entries:

- What kind of skill is it?
- Is it acquired gradually through exposure to repertory, so that the student one day realizes the extent of his or her new ability, or does one master it all at once?
- What stages might this learning process entail?
- What stages of development are represented by students in the class?

Berthoff prefers the term "dialectical notebook" to "journal," as students are apt to regard a journal as a kind of unfocused diary. These notebooks are intended to encourage and reflect an orderly process of thinking (see Fig. 1).

Figure 1. Journal entry format

The left side contains a record of thoughts, reactions, lists, questions in reaction to the reading assignments. These are the raw material of statements, not necessarily expressed in careful grammatical fashion, but demonstrating a concern for capturing students' thinking with precision and vividness.	The right side contains a synthesis of ideas presented on the left, a refinement of categories, an opposition of arguments, a joining of debate.

From this material, students may be ready to create a convincing paragraph or two to use as a springboard for the next class discussion. This will be the basis of their first more extended writing assignment.

For many students, learning is supported and expanded by writing journals. In the following example, the student approaches

the utility of journal writing from a very personal point of view. At first, her journal entries focus on problems. Her first step is to speculate on her current difficulty in learning solfège.

> Part of what makes our teachers and critics so powerful is the total responsibility we give them for our development. All semester long I kept hearing the same things from my solfège teacher in our tests: "Recover on your hand, not your voice," "When are you going to take your syllables seriously?" "Subdivide!!" and I always left feeling as though I had been given a taste of some very bitter medicine. Yes, I know all these things were going wrong. Yes, I'll work harder! In fact, I developed such an aversion to my solfège "problems" that I put less time into practice. I didn't see the point of pursuing something that caused me such agony and discomfort. This is when I became a solfège victim. (SJL, soprano)

For SJL, finding the problem was the beginning of an effort to identify a course of action:

> I set out after Spring break ended to close the gap between knowing what my solfège problems were and knowing them for themselves .... The idea of keeping a journal struck me as a friendly and familiar way to mark my progress in solfège. I could use it as a second self with whom I would discuss my observations and discoveries. (SJL)

But what goes into a journal at later times? Using a double-entry format, she notes which strategies she intends to enact in a practice session,

> Sing only the beginnings of note patterns in musical passages.
>
> Practice saying syllables [note names] separate from their rhythms.
>
> Practice a scale with different accidentals.

followed by comments that reflect the effect of the various strategies:

> My tonality improved with a stronger focus on patterns.
>
> My rhythm is pretty confident when I take the time to practice syllables first, just in the way that my sight singing rhythms are ok when I am secure with the key signature.
>
> Exploring the effect of different placements of half steps helps me modulate more effectively.

The journal is also a place for the unexpected. Creating a column "Discoveries I make through the day" allows consideration of surprising events which lead to further discovery. For example re-

experiencing the feel of scale steps on the violin led to further reflection on the shaping of tonal relationships through the use of half steps:

> Today I picked up Clayton's violin while he was waiting for his violin class to begin and I rediscovered the closeness of 1/2 steps. I hadn't touched a violin in at least 4 years (I studied violin from age 10-15) and when I first tried to play a C major scale I sharped the C. With a violin the closeness of 1/2 steps is so physical - two fingers touching! I will have to bring out my violin and experiment with how different keys feel. (SJL)

In the final analysis it is hard to judge the worth of reflective thinking without looking for transfer of this thinking into specific practice. In this case, SJL decides to employ a tape recorder to continue monitoring the effect of her work. Taping the preparation of class assignments is a surprisingly rare occurrence, but when done, it serves well to focus the journal on the question of assessment. She reflects on using the double-entry journal method as she develops a strategy for using the tape recorder:

> Toward the end of this four-week period before school ended I finally began to tape my sight singing, something I had not been at all eager to do.... For the first taping I stuck to very simple exercises and wrote down my comments once after each exercise was finished, and again later after listening back to what I had done. I concluded with overall comments. I taped myself twice, each time filling my journal with comments. (SJL)

and then adds annotative remarks:

> Listening to my warm-ups was enlightening! And soon I isolated what made a good warm-up and a bad one and developed some schemes to use on the departmental test. Listening to my rhythm errors was also useful—just being able to catch them by conducting along showed me exactly when and where my hand went off. Unfortunately, my singer's desire for the right notes and intonation distracted me from developing a rhythm warm-up which is something that would be very useful in the upcoming departmental exam. (SJL)

Her final journal entries occurred after the final class and final exam. True to the spirit of reflectivity, she cannot resist adding comments about her final sight reading performance in relation to her prepa-

ration and, more importantly, her plans for working further on remaining problems in rhythm in the coming summer months:

> My progress, which was marked in the Departmental [examination] and in my final, was a result of more focused and specific practice. Looking back in the journal I can see that when I isolated a problem and worked on developing schemes for change, I made progress. Likewise, in the areas which I had neglected, I did poorly in both the class final and the departmental. (SJL)

> Now I have a clear solfège diagnosis for the summer and if I continue to work during the vacation I will make conducting Bona [rhythmic exercises] in bass clef a priority and also try to develop a rhythm warm-up which I can use when I sightsing. (SJL)

Reflections on Assigned Readings

At the New England Conservatory, assigned readings provide a particular focus for class discussion. Figure 2 outlines a specific set of readings all students use to reflect on their progress in their music theory skills. These readings are chosen to help focus on three areas central to developing fluency in reading: the difference between novice and expert behaviors in various domains, the comparison between music and language reading subskills, and the role of schema in reading comprehension. As class discussion broadens to reveal students' notions of skill in general and how sight-singing skills are acquired, papers are assigned. Note that, with each reading, the purpose of the reading is closely tied to the goals of the class. The writing assignment encourages the students to declare their understanding of the article in their own words, helping them bridge the concepts in the article and their application in music theory skills.

The first reading is "The mystery of mastery", by Robert J. Trotter. In this reader-friendly article, Trotter illustrates the issues of skill development with examples drawn from chess and basketball. Students have a lively time relating these to their own expertise as performers and their sometimes frustrating steps as sight singers. Their assignment is to write an exposition of Trotter's stages of mastery and suggest how they might apply to music reading.

An assignment schedule for solfège essays was developed so that each faculty member had the same objectives. These guide-

Figure 2. Sight singing and reflections on readings

READING	*PURPOSE*	*WRITING ASSIGNMENT*	*APPLICATION THEORY SKILLS*
Trotter (1986), "Mystery of mastery." (pp. 32-38)	Provide a developmental framework for complex skill acquisition in any domain	Explain the framework in the article including examples from a chosen domain	Describe a framework by which learners can map their own stages in music reading skill development
Downing & Leong (1982), "Reading as a skill." (pp. 13-28)	Reflect on language reading skill processes by way of providing a list of important reading subskills	Select three language reading subskills: compare and contrast with other language or music reading subskills	Reflect on specific analytic components of reading process in music reading skills in solfège class [provide specific musical examples]
Hirsch (1987), "The Discovery of the Schema." (pp. 33-69)	Provide perspectives on the role of background knowledge in reading	Describe the concept of schema in reading	Describe the role of schema in reading music [provide specific musical examples]
Self-Selected	Synthesize views from all three articles, revisit a single reading in more depth, begin a new line of inquiry based on a previous reading	Self-selected	Self-determined

lines proved to be very useful as an integrating tool. They were developed through collaboration among the faculty. Those for the Trotter article were:

A. Proposed essay topics:

1. How do we acquire musical skills? In answering, use both Trotter's theory of skill development and the lessons from your own experience.
2. Describe your acquisition of a nonmusical skill and then compare it to that of a musical skill.
3. What kinds of abilities do you think are innate, and what kinds are acquired?
4. Can we apply Trotter's idea of a five-step development (from novice to expert) to acquiring proficiency in sight singing? What do you think will be your own development in that skill?

B. Teacher aims:

1. Determine whether or not the students have actually read Trotter's essay (a small but valuable step).
2. Alert students to the ways in which Trotter's theoretical understanding parallels (or contradicts) their own development.
3. Present students with the idea of simple, individual, comparisons and contrasts.
4. Help students organize such comparisons and contrasts into coherent arguments.
5. Encourage students to further refine such arguments into overarching theses about their own skill development.

The first writing exercise is due a week after these first discussions of the Trotter article. The teachers review the papers for persuasiveness and clarity; when possible, individual conferences may be held to show students how to be as convincing as possible. Then the papers are read with an eye to content as it relates to music reading. These drafts become the basis for a more focused class discussion. Particularly useful papers are those which illuminate the idea of developmental stages of expertise and how that concept can be seen clearly from personal experience:

> The second stage begins the long process of refinement. The student now begins to gain fluency and ability to deal with the basic rudiments in a larger musical context. . . . Where a novice might have looked at the notes d F# A D and read them all separately, an "advanced beginner" might read those notes as a D major arpeggio. This sort of recognition is considerably more sophisticated in its capacity to recognize symbols in groups or units (sets) having a separate meaning as a whole from the individual symbols. (JB, soprano)

Also, students' criticisms of the article serve to elucidate criteria that may be used to define expertise:

> There are a few issues discussed that I would like to question. . . . To begin with, can a job be done effortlessly or does it only appear to be that way? Trotter also stated they (experts) almost never make mistakes. . . . Is it that they almost never make a mistake, or is it that the performance level is so high that they 'cover up' or compensate for a mistake in such a way that it appears to have never happened? (TK, music education)

By questioning the definition offered by Trotter, the class, working together, learns to interpret the article in terms of musical values. For musicians, expert performance indeed concerns many aspects of "virtual" rather than absolute perfection.

To help students become aware of the various subskills valued in music reading, we assign a second reading. 'Reading as a skill' from the *Psychology of Reading* by Downing and Leong challenges students to review and select the characteristics of language reading skill as a source for observations on music reading. They must refine their understanding of the process of sight reading in order to discern its similarities to and distinctions from general reading. The teacher guidelines for shepherding students through the Downing and Leong chapter include:

A. Proposed essay topics:

1. Is your own method of acquiring reading skills on your instrument similar to acquiring skills in sight singing? In what ways is it similar or different?
2. Can we compare language reading skills with music reading skills? Use three of Downing and Leong's defined skills to explain your argument.

3. Select three of Downing and Leong's language reading skills that you think are important, and three that you think are not as important to your music reading or sight singing. Explain what these examples show.

B. Teacher aims:

1. Determine whether or not the students have actually read Downing and Leong (still a valuable goal, even at this late stage).
2. Show students how to select, use, and illustrate examples from their reading(s).
3. Teach students ways in which to organize and develop those examples into ideas and arguments about the work they are reading or doing.
4. Encourage students to develop clear, cogent, and compelling theses from the examples and arguments they have fashioned.

At first, students find that this reading provides a 'compare and contrast' exercise in describing reading skill components. But they quickly discover that novices at music reading need to conceive of reading skills in some hierarchical fashion.

> Sight singing courses are set up in a way that teaches a hierarchy of subskills: first demonstrating and using only syllables, then adding rhythm to the syllables, and eventually combining syllables, rhythm and singing. Each part can be practiced individually and then when fluent alone, brought together. (LL, French horn)

Students are also encouraged to identify certain language reading traits that may be most useful in music reading skills:

> *automaticity*: In solfège, the performer can execute a pattern subconsciously while attempting to concentrate on a subsequent pattern, that is, it automatically enables him to look ahead in the music and prepare for a more difficult passage.

> *anticipation*: In general performance, observing only the measure being performed is a well known *cardinal sin*.... If the expert is able to combine his 'anticipation and feedback' skills he may very well be able to see a mistake and correct for it *before* it occurs. (JB, woodwind)

In this case, not only are students suggesting useful analogies between language and music reading skills, but they are also selecting criteria for developing more expert levels of these skills.

"The Discovery of the Schema" from *Cultural Literacy* by E.D.Hirsch is the third reading. This chapter, whose polemical nature and political subtext give some teachers plenty to talk about, is useful from a sight singing point of view for its exposition of the concept of schema and the role schema play in reading comprehension.

The teacher guidelines for guiding the students through the Hirsh reading include the following:

A. Proposed essay topics:

1. "For readers to integrate phrases into comprehensible meanings, they must already possess specific, quickly available schemata" (p. 60). Does Hirsch's belief in the importance of schemata apply to learning music? If so, how? If not, why not?
2. "Once the relevant knowledge has been acquired, the skill follows" (p. 61). Based on your own experience in acquiring musical knowledge and reading skill, what do you feel to be the interaction between acquiring relevant knowledge and reading skills?
3. Hirsch develops a model for cultural literacy. Can we do the same for musical literacy? What schemata would we need, and how would they be applied to the reading, study, and performance of music? Describe two kinds of performance(s): one where musical literacy is needed, and one where it is not.

B. Teacher aims:

1. Determine whether or not the students have actually read the Hirsch chapter (thus preventing an attack of irony).
2. Emphasize the ways in which examples create the models in Hirsch's writing and teach students the difference between arguing over examples and arguing about the model being constructed.
3. Show students ways to recognize, consider, and criticize Hirsch's schemata.

4. Encourage students to recognize the role and value of such schemata in argumentative writing.
5. Accentuate the need for a clear and relevant thesis in support of, or critical of, Hirsch's ideas.

At this point, class discussion focuses on the theory of reading. Students whose sight reading is beginning to develop in complexity of clef, meter and key make observations about the use of patterns and their own predictions and intuition in a dynamic, expressive solfège performance. The nature of grouping, creating organization and order based on experience, is fundamental to successful sight reading. Many student sight readers have little control over the process of "chunking," which is so crucial to successful reading. This article and the writing which follows from it lead students to a better understanding of their own schemata.

Typical responses to this assignment reveal that the understanding of a music reading schema can be seen in at least three distinct ways. Students write about *decoding or technical schema* (pattern reading in relation to the page and the instrument), *background literature as schema* for understanding (knowing about Mozart's first four violin concertos before tackling the fifth), and an *'interpretive' schema* (tools for making interpretive decisions based on structural or theoretical knowledge not directly stated in the music). The following excerpts suggest how students struggle with all three perspectives in building a more comprehensive understanding of music reading skill development:

> To gain literacy, one must also recognize basic patterns and their function before drowning in the details of a piece. Intervals must be recognizable and retrievable at the speed of a reflex, patterns containing them must be grouped, and sounds united by key, and patterns by rhythms. Hundreds of notes will be given a purpose and a role in a larger schema that is more comprehensible and manageable. (JB, soprano)

> Artistic schemata must also be used when learning music. It is absolutely necessary that one "infer meanings not directly stated" and "apply relevant background knowledge". Inferred meanings could involve the use of dynamics when they are not directly stated, the artist's subtle change in a phrase when it is repeated more than once, or even the ability to recognize the climax of a phrase and to apply the appropriate stress. . . . Thus far, the acquisition of technical schemata

> has been essential in our solfège course. Pattern reading has been a primary aspect of the course, and I suspect that recognition of chord progressions and resolutions will become standard, later in the course. . . . However, we are beginning to experiment with phrasing, and I predict that as our sightreading skills become more finely tuned, we will begin to look for deeper meanings and interpretations for the notes on the page. (FK, soprano)

The fourth paper grows out of the previous three, either as an extension or a reaction, depending on the issues a student identifies as important in his or her continuing development. A student's work may suggest further reading, and the last paper will be an exploration of this new text. Alternatively, a student may want to refine or elaborate ideas from one or more of the earlier papers. For still other students, issues may have been raised which suggest further exploration by interviewing each other, students in other teachers' sections, upperclassmen, faculty, or previous teachers to gather information critical to their understanding of learning processes. In these last papers, students are able to focus on issues that have developed from the earlier semester work as well as develop a deeper level of inquiry. Sometimes, serious questions are raised about the differences between the development of reading skills in children and adults.

> Does solfège come more easily to children than it does to adults? Adults definitely have more readily available schema in terms of music theory, for they have been studying music and their instruments for many years. Does the availability of theory schema make solfège easier to learn? After observing (solfège) classes (ages 8-16) at the Longy school of Music in Cambridge, I discovered the answer wasn't a simple one. (CB, soprano)

Do conservatory students learn to read differently from children because of the different levels of conceptual understanding? The level of reflection is often most impressive. Not only is the music student reflecting on past work shared in class papers and discussions, but is building a new research agenda about extremely important issues for music education. We suggest that answers to these kinds of questions will come from creating a stronger role for reflective writing not only within this solfège course, but also in other courses concerned with literacy skills at the conservatory level.

Pros and Cons for Reflective Writing in Performance Skills Classes

It is useful to anticipate arguments against the re-formation of the basic skills curriculum. Certainly at the New England Conservatory there were many concerns that had to be considered: lack of time, irrelevance of the course of study, and a narrow view of what learning entails.

Music students never have enough time. They need to be disciplined and efficient in order to practice. Consequently, some faculty ask, "Why engage students in time-consuming reading and writing which is not obviously a critical aspect of a class?" For others, learning to play and read music is a simple, intuitive process that is assumed to accompany learning to play an instrument. Still other instrumentalists take another stance, "What can learning about basic concepts of learning and cognitive psychology have to do with students' music studies?" These faculty narrowly assume that learning how to play an instrument is what a music school is all about. In their view, developing such proficiency is a task that does not depend on knowledge of theories of cognition, nor does learning to articulate the components of reading skills require writing papers. After all, who among the faculty learned to read music through this process?

These issues trouble some faculty members more than others. Nevertheless, they are issues we have to consider. As usual, the students cleared the way for this approach once they realized its impact on their own musical development.

The theory faculty did not carry out the entire new educational thrust without help. It soon became apparent that simply assigning readings and attempting classroom discussions were not the most effective means of developing an understanding of the value of reflection or of the core of concepts learned in class. We needed some help with structuring and carrying out writing assignments. After we initiated the program, we established a two-year collaboration with the teachers of the basic writing skills program in the Liberal Arts department.

The teachers of the basic writing program welcomed our proposal. They had a problem of their own: how to get students engaged in writing and thinking about topics which were important

to them and not merely fulfilling requirements to gain course credits. The solfège I class is a high stakes course during which all incoming undergraduates must demonstrate fluency reading diatonic music before they are allowed to take any other theory course. The design of the course places it between performance on the one hand and academic courses on the other. Because of that, the writing teachers decided to add the requirements of the theory department to their course schedule.

Our students, who often are not experienced with critical reading, needed a structure to deepen their reflection about the articles and about the readings' relation to their own experience. We began to work out writing assignments, journal questions and pre-writing exercises to focus and amplify students' reading and discussion. As a result of intensive, music-focused work in their solfège class, students became observers of, as well as participants in, their own learning and the learning processes of others. Almost immediately they reported connections between theory classes and their private studio instruction, and began to understand how to diagnose problems which they encountered in various other musical contexts. They could now see the relevance of their writing classes.

For our part, the collaboration was very helpful. The writing teachers helped us develop central questions for each reading, counseled us that we would get better results if we gave a bit more time for the writing, and helped us learn about the role and power good questions play in reflective thinking. After the collaboration was over, we had learned how to use questions, organize assignments, and sustain the work within the context of the solfège curriculum.

How did this relatively quick turn-around occur? First, our own faculty members began to realize that students learn best if they are treated not as children beginning to learn a difficult set of theoretical drills but as adults beginning to coordinate a complicated matrix of skill and knowledge. We made them apprentices in the trade of interrelating music reading, hearing, and imagining rather than holding them accountable to the tasks of the textbook. Of course, teachers who construct adequate drills and run a good class will significantly increase the competence of their students to execute patterns skillfully. But is that enough? Is this the most effective or efficient way to learn or improve a skill? Does it support working

beyond the textbook and the specific examples studied in class? Does it provide students with generalizable information and technique? What level of engagement does it generate for the student whose other musical work is being carried out on a much higher plane of interest? Does it lead to understanding and independence?

In the past, theory teachers observed that the skills they foster in their students do not necessarily last very long beyond the conclusion of the course. The knowledge which seems secure in the theory classroom is unavailable in the teaching studio or in the ensemble rehearsal; even last term's understanding of voice leading cannot be summoned in this term's work on part writing. It is hard for students to generalize from what appears to them to be a very narrow, highly specific body of theoretical knowledge and technique.

Now, we see the transmission of a view of theory intrinsically related to music making as perhaps the most important part of our teaching. A student who sees music as sets of discrete knowledge, as drills to be done, as requirements to complete, will never really use theory skills in a musical way or develop the rounded view essential for a musician. The students who understand the nature of the process they have begun are more likely to know how to continue in that process. The students who, after one semester, make observations like those quoted above are students whose minds are ready to think about music.

As a result of generative discussions and reflective writing about their work, students engage real problems in the use of scores and in their own repertory, as well as in carefully selected material from the standard sight reading sources. They do more than solve problems; they pose problems for themselves, and engage in problem finding in a problem-solving context. Learning the importance of problem analysis and diagnosis in developing skills and teaching, they confront the concept of the schema in reading comprehension. For the faculty, there are broad changes as well. As teachers who deliberately planned to share the essential tools of learning with students, we found ourselves discussing principles of cognitive development and skill acquisition in solfège classes.

We also had to consider the influence of reflective writing on performance standards. The time taken from class to carry out these discussions and assignments could seriously lower the level of students' achievement. Fortunately, at NEC we have a system of stan-

dardized departmental exams which establish benchmark criteria for completion of the theory requirement (Davidson, Scripp and Meyaard 1988). Twice each semester, all solfège students take these performance exams. Over a number of years we have been able to track patterns of growth, compare various approaches to sight singing, and observe the effects of curricular changes and refinements. The exams show conclusively that the substantial amount of time spent on reading, writing and discussing skill development does not have a negative impact on students' scores. Although students certainly have much less in-class drill work, their skills continue to progress. Even more convincing, there are strong positive correlations between the quality of work on performance exams and the quality of reflective thinking (not necessarily spelling or grammar) in their written papers and journals. That is, the students who are highest achievers in their sight singing exams tend to be also the students who do the most reflective writing.

It appears that developing reflective writing habits in the course of building sight singing skills provides students with a way to

- develop ideas about skill acquisition,
- think critically about progress with their course work,
- develop and monitor practice strategies,
- continually update personal goals,
- develop a framework for progress beyond issues of accuracy,
- create a context for comparing instruction and pedagogy within and across sections of the course, classes, schools and even countries,
- generalize from sight singing to other musical skills, and
- draw new conceptual distinctions that differentiate craft and artistry, innate and acquired skills, process and result.

Although we were not sure of what we were doing at the outset, our work has transformed our understanding of teaching and learning. We developed a reflective curriculum through a process of intensive experimentation and documentation of student learning within the theory program at the Conservatory. This curriculum development was the result of step-by-step research taken by the faculty; the progress of our research plan can be summarized as follows:

- Theory teachers decided to share essential concepts and tools of learning with their students. This meant developing courses which added a focus on reflection, in addition to performance and listening activities, thus rounding out the three ways of knowing, i.e., production, perception, and reflection.
- Experimentation with reflective thinking led to the formation of a collection of assigned readings drawn from a variety of sources in music, psychology, and educational theory.
- Students were encouraged to become observers of, as well as participants in, their own and others' learning processes through reflective writing.
- During the changes within the course, performance standards could not be sacrificed. Somehow, they had to be maintained throughout the course of these experiments. Results from our work show that 1) although under this program students certainly had less in-class drill work, there was no decrease in the level of quantitative scores in standardized departmental performance exams and 2) strong positive correlations were evident between the qualitative aspects of performance (e.g., type of comments during exams and the range of reading strategies employed).
- As a result of this program, faculty members report dramatic changes in their classroom culture as well. The standards of reflective writing, level of classroom inquiry, the quality and clarity of discussions, and the degree of interaction among students have all changed. In summary, quality of work on performance exams as well as the quality of reflective thinking as seen in questionnaire responses, journals, and papers have all improved.

Retrospections and Conclusions

In retrospect, developing a reflective writing component in the theory curriculum has served to support and further the goals of a musical education. Taking a controversial subject usually treated as an afterthought in music programs, we have made solfège a course that requires critical and reflective thinking in a context of skill de-

velopment. Students who make writing a habit have a way to form and develop their ideas, think critically about course work, develop practice strategies, and continually update personal goals. These young musicians have a better chance of using their newly acquired skills in the service of broader musical understanding and goals.

Writing gives room for individual thinking (until now not a prominent aspect of solfège instruction) and develops a framework that extends performance skills beyond mere accuracy. As teachers become sensitive to the information students are conveying, this framework becomes a more powerful tool in the classroom. Reasons why some students succeed while others stagnate become clear to the teacher as well as to the student.

There is now a context for comparing pedagogy within and across sections of the course, classes, schools and even countries. This issue is not trivial at NEC, which has a very great diversity of cultural background and preparation in terms of musical experience, writing skills, and orientation to learning. We find that the lively participatory classroom we are developing, with a strong emphasis on students' individual understanding and responsibility, is particularly productive for all students when there is time allotted for dialogue and self report in individual assessment.

What about the extra work this program generates for teachers? Do teachers welcome the extra time it takes to respond to and assess writing in the performance classroom? At NEC, yes. Our faculty see positive results in students' attitudes to the course and in their willingness to give attention to their work. The nature of the classroom experience for teacher and student has produced a changed and enlarged view of solfège itself. By understanding the components of skill development and the kind of process involved, students resist less the necessity of learning to sight sing and the highly formal techniques and learning strategies we emphasize (Scripp and Davidson, 1988). Their increased understanding of, and participation in, the pedagogy gives them a greater ability to generalize from sight singing to other musical issues, and they begin to integrate their musical experiences in ways more typical of experienced artists than students. They are provided with a means of differentiating craft and artistry, innate and acquired skills, and process and result; and they have a vocabulary with which to express themselves.

The context of teaching changes as wider issues are brought in to the classroom. The role of the instructor has expanded; the teacher continues to work like a coach, but the role of discussion leader and facilitator is added. The classroom becomes much more interactive as students accept responsibility for the plan of their progress. At the same time that more focus is placed on student instruction, more input is sought from students.

Valuing reflective writing in music theory classes fosters a surprising level of powerfully charged writing and descriptions. Journals are introspective in nature. Keeping a regular journal often leads to a quality of lucid self discovery that can create new avenues of understanding particular to the class experience and the curriculum.

A potent illustration of this resulted from the unusual experience of having a senior faculty member from a large mid-western university join one of the beginning solfège classes. This French professor, an amateur singer who wished to incorporate the study of chanson into his classes, took his sabbatical year at the New England Conservatory. His participation allowed us to see our concept of the reflective curriculum in a new way. In addition, his comments provided us with a control condition that enabled us to look even more closely at the impact of a reflective curriculum. How would our reflective curriculum play for this experienced teacher?

The comments that have been cited previously in this paper were those of average music students of 18 to 21 years in age, beginners in the deliberate use of reflective thinking as a tool in learning a skill. The comments below are those of a person well experienced in reflection, a seasoned teacher who was some thirty years their senior. His participation illustrates even more dramatically the potential and scope of a reflection-based approach to college-level musical skills courses.

He summarizes his journal entries from his first-semester work by writing about the "Geography of solfège" as his fourth paper assignment. In creating a map of the course, he provides a vivid description of what students experience in the course: the problem of proceeding to work with what at first seems utterly unfamiliar, inscrutable, unfathomable:

> During the course of the semester it has become increasingly evident to me that I was passing into a wondrous land whose contours I was only barely discerning. In the beginning . . . there was chaos and confusion. The place I had landed certainly seemed inchoate and I did not know how to find, discern, recognize or name landmarks that would begin to outline a path. From this perspective I am reminded of one of the examples in Trotter's "Mystery of Mastery" article. Trotter, citing research by others, mentioned that when individuals were shown a picture of a basketball game in which the players were placed randomly, the individuals could not recall many of the individual items in the picture. If the same individuals, however, were shown a picture of a specific play in formation—that is to say a picture in which the players had a structured relation to each other—many more details could be recalled. It is now clear that I was in an analogous situation. While the landscape that was presented to me did eventually turn out to have structure I was unable to perceive it. I was faced with thousands of stimuli and possessed no mechanism or code for perceiving or giving them a structure which would allow me to understand what I was seeing. (PR, voice)

Later in his summary he writes about the nature of discovery of new structures and relationships in music. In his writing the excitement of intimate knowledge of scale structures is palpable and illuminating at the same time:

> If the cycle of sounds were to repeat itself regularly, it would be impossible to have a sense of anything other than repetition. If the cycle is altered slightly, however, with the addition for instance of a different size step—one could call it a turn or potential turn rather than half a step—closure is possible. That is to say one can use the half-step difference to signal an end, to make the beginning a final point. Moreover, and even more exciting, one can create innumerable possibilities of difference by moving the location of the half step, thus changing the notion of where one is ending and thus where one is going. (PR, voice)

In terms of understanding the act of generating tonal relationships he reports, "some kind of vast consciousness into which I am stepping, a space unknown to me . . . [where] one is participating rather than controlling, in tune with rather than mastering;" and he struggles to understand music in terms of literary devices, for example, irony as a metaphor for modulation. Summing up his journal review, he offers an image of exactly where the first semester ends—on the brink of learning to control modulations. Without his

words, however, we might not understand the visceral difference between the structure of the pedagogy of what is to be learned and the experience of self discovery that we suspect occurs in different ways or varying degrees with each individual student.

> The temporality of the space is also complicated. Past, present and future must be almost simultaneously present. The tonic, whether sounding or not, must always be there. If its literal, external sound has passed, the mind keeps it in the space, always in play. With modulation, the future must also be actively engaged. While changing keys, a new future/past memory tone arises. In very effective ways, then, what is in the mind is brought into consonance with what lies outside it. Imagined time and real time flow together, imagined sound and real sound are the same, the world within and that without are brought together. One is simultaneously acutely aware of self and has lost it in a world which flows over and through everything, one is in control—and helpless. This, then, is where I presently find myself—at the edge of a center. By various stumbles and false paths, by lucky leaps and solid direction my sense of the territory over which I have come is more secure. While earlier the new caused panic, now it raises a sense of anticipation and eagerness. I want to step into that center and look around. (PR, voice)

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Research on Tonal Perception and Memory: What Implications for Music Theory Pedagogy?[1]

Elizabeth West Marvin

Introduction

Let us begin with a few straight-forward questions: why should music theorists read psychology journals? What can psychologists who are nonmusicians or amateur musicians tell professionals about music hearing and learning? And what can the results gleaned from highly controlled laboratory experiments have to do with our "real-world" theory classrooms? For teachers of music theory who have pondered these questions, but have not yet found time to sit down with the appropriate books and journals, be assured that music theorists are addressing these questions (and more) in print. If you know where to look, you will find music theorists thoughtfully critiquing the cognitive science literature, interpreting empirical research for the classroom, and implementing their own experiments based on issues that have arisen in their teaching.

To those who are new to this research area, however, the sheer number of experimental studies on music perception and memory may seem daunting—hence the reason for this article, which is intended to serve as an introduction to the field for classroom teachers of music theory. Because the discipline's purview is so broad and diverse, this discussion centers around a recommended read-

[1]An early version of this paper was presented as the Keynote Address for the Texas Society for Music Theory's 1994 annual meeting at Lamar University (Beaumont, TX).

ing list, intentionally limited just to the areas of tonal perception and memory—critical elements for undergraduate theory teaching. The articles cited examine patterns of interval recognition and confusion, cognitive strategies for melodic recall, sight singing, and dictation, and perception of tonal hierarchy, modulation, and large-scale formal design. Topics such as rhythmic perception, aesthetic response, expressive timing in performance, and perception of nontonal music have likewise generated a considerable body of empirical research, but a discussion of their results and pedagogical implications is beyond the scope of a single essay.

The selected bibliography at the end of this article is divided into four parts; this organization models both the ordering of our discussion and the order in which interested readers might tackle the list. Although the bibliography is organized topically, books and essays are numbered consecutively throughout to facilitate their citation in the body of this article; Arabic numerals enclosed in parentheses will be used to refer to specific entries. The bibliography's first part recommends three good overviews of the field, from which the reader will quickly discern the scope of the discipline.[2] Part two cites a number of experiments concerned with the mental representation of melodies. This is an area of research with clear implications for the classroom, and several articles by music theorists attest to this fact. Part three focuses upon the perception of tonal hierarchy and closure, an area of research in which music theorists have taken some psychologists to task. These studies ask some very basic questions with important implications for theory instruction: for example, can we really hear hierarchical structure in music? Does the *Ursatz* have perceptual validity? Is it appropriate to teach analytical methods that reveal relationships many listeners may not hear? Part four is organized around the issue of individual differences: what does music-cognitive research tell us about the differences among our music students? What, for example, should teach-

[2]Music libraries will not carry all of the journals represented in the bibliography; some are specialized journals in psychology. Interested readers will need to use a university library or rely upon inter-library loan. However, the three excellent texts cited in the first part of the bibliography ought to be acquired by any good music library, as should the interdisciplinary journal *Music Perception*.

ers do with absolute pitch (AP) students— simply exempt them from sight singing classes by exam? Are there different music-cognitive strategies between AP and non-AP students, between composers and performers, even between male and female musicians?

Interaction between music-theoretical and music-cognitive research is still in its early stages, but it is growing. This growth may be seen in the increasing number of music theorists presenting papers at the annual meetings of the Society for Music Perception and Cognition (over a dozen at the 1993 annual meeting in Philadelphia),[3] and by events such as the Special Session at the 1992 Society for Music Theory meeting, where prominent psychologists Edward Carterette, Jay Dowling, and Carol Krumhansl shared the podium with music theorists Patrick McCreless, Joseph Dubiel, and Janet Hander-Powers.[4] In many ways, the interaction between disciplines still represents an uneasy alliance, however; thus some articles by music theorists in the bibliography cite the results of music-cognitive experimentation to support specific pedagogical recommendations, while others criticize specific experimental studies for flaws in their methodology or in the interpretation of their data.

Research on Melodic Perception and Recall

We begin our discussion on the positive side of the uneasy alliance, with articles (#14-16 in the bibliography) by Gary Karpinski, Bill Lake, and Steve Larson—all writing in the *Journal of Music Theory*

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[3]Presenters included Robert Gjerdingen, Edwin Hantz, David Huron, John Kelleher, Steve Larson, Fred Lerdahl, Justin London, Elizabeth West Marvin, Richard Parncutt, Jay Rahn, Burton Rosner, and William Thomson.

[4]At least one of these papers has now appeared in print: Carol Krumhansl's "Music Psychology and Music Theory: Problems and Prospects" in *Music Theory Spectrum* 17/1 (1995): 53-80. Of particular interest are the article's first eight pages, which present a "schematic history of the psychology of music from the point of view of how it has been influenced by music theory" (p. 80). The remainder of the article discusses ways in which the basic tenets of Eugene Narmour's implication-realization model for melodic expectancy can be fashioned into testable hypotheses, and Krumhansl reports the results of an experiment she designed and carried out to test these hypotheses.

Pedagogy—which draw upon research in music cognition to support the pedagogical approaches they use in their classrooms. To some degree, these articles (and the present one) answer the challenge posed by David Butler and Mark Lochstampfor to "synthesize experimental results from the research area of music cognition so that they may be applied directly to aural training."[5] Karpinski, Lake, and Larson all share a pedagogical interest in how students represent melodies in memory. Teachers generally must infer students' mental representations by observing their successes or failures in melodic dictation and sight singing. In the United States, most music theorists impose a scale-degree based strategy for melodic representation upon their students when teaching these skills, as evidenced by the prevalence of movable-do solfège and scale-degree sight singing instruction over fixed-do solfège, which instead teaches pitch-class identification.[6] Steve Larson's article (#16) strongly advocates movable-do solfège, with do-based minor, as the best pedagogical model of scale-degree function, and he supports his argument by drawing upon psychological experimentation and principles of Gestalt psychology.

It may come as some surprise to music theorists that the mental representation of melodic pitches in relation to a key center has been an issue of considerable controversy and experimentation in music-cognitive research over the years. At the root of these experiments is the very basic question cited in Figure 1: just what is it that listeners remember when they hear a melody? Is it a pitch-class succession, a contour plus scale type, an interval succession, scale degrees in a key, or some combination of these? The first of these possibilities is that listeners remember melodies as collections of

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[5]David Butler and Mark Lochstampfor, "Bridges Unbuilt: Aural Training and Cognitive Science," *Indiana Theory Review* 14 (1993): 6.

[6]For documentation, see Randall G. Pembrook and H. Lee Riggins, "'Send Help!': Aural Skills Instruction in U.S. Colleges and Universities," *Journal of Music Theory Pedagogy* 4/2 (1990): 231-241. The authors note (p. 236) that of 518 responses, 57% of respondents use some type of movable system (either numbers or movable-do solfège), while only 19% use a fixed system (either fixed-do or letter-name singing, with or without inflections).

pitch classes. Pitch-class recognition would explain the ease with which listeners recognize untransposed melodic repetitions or melodies repeated an octave higher or lower. It would not account, however, for the ease with which listeners recognize exact transpositions, or the difficulty listeners experience when asked to recognize familiar melodies in which random pitches have been displaced by an octave, thus retaining their pitch-class identity but possibly violating the contour of the melody. This octave displacement effect has been clearly demonstrated by Diana Deutsch in her experiments on pitch and pitch class.[7] These experiments are briefly summarized by Rita Aiello in her introduction to W. Jay Dowling's "Melodic Contour in Hearing and Remembering Melodies" (#9).[8]

The pitch-class model of melodic representation cannot explain the ease with which listeners recognize and sing tonal melodies transposed to other keys, especially distant keys that share few common pitch classes. This question of melodic recognition after transposition was investigated by James Bartlett and Jay Dowling in 1980

Figure 1. How do we represent melodies in memory?

Strategy	*"Are You Sleeping"*
1. Pitch-class succession	C-D-E-C
2. Contour plus scale type	<++-> plus major scale
3. Interval succession	+M2 +M2 -M3
4. Scale degrees in a key	Major key: 1-2-3-1 *or* do-re-mi-do
5. Some combination of these	

[7]In Deutsch's early publications, the terms "pitch height" and "chroma" are used for "pitch" and "pitch class," respectively. Deutsch summarizes her findings in "The Processing of Pitch Combinations," in *The Psychology of Music*, ed. Diana Deutsch (New York: Academic Press, 1982).

[8]An aural example based on Deutsch's octave-displaced melodies can be heard on the compact disc that accompanies David Butler's fine book, *The Musician's Guide to Perception and Cognition* (New York: Schirmer Books, 1992). This demonstration could be used effectively in theory classes to illustrate the aural difference between pitches and pitch classes in a musical context. Butler's text comes not only with a compact disc of

(#5); the experimenters asked listeners to distinguish between exact transpositions of unfamiliar melodies (called "targets") and intervallically altered replications of these melodies (called "lures"). Listeners more often confused lures with targets when heard in distant keys than when they were heard in closely related keys. The authors concluded that "the results support the psychological reality of key distance and are consistent with both musical and non-musical-auditory theories of its effects."[9] Annie Takeuchi and Stewart Hulse (#12) subsequently refuted this finding in three different experimental contexts; they pointed out that if key-distance effects were a psychological reality, then this would imply that most listeners have some degree of absolute pitch, and that they "encode" pitch-class note names in memory. Aural skills teachers would suspect that this is not true; this intuition is confirmed by Takeuchi and Hulse, as well as by Croonen and Kop (#6).

In some of Dowling's early work, he posited the melodic representational scheme given as the second option of Figure 1: that melodic contour is an abstraction that can be retained independently of pitches or intervals. In his two-component model for memory of melodies, tonality was posited as a kind of framework upon which contour may be "hung"; thus listeners would actively reconstruct melodies in memory from scale information plus contour. This model would explain Dowling's finding that listeners have difficulty distinguishing between a tonal melody and a same-contour lure that begins on a different scale degree of the same key, since the two melodies represent the same scale and the same contour, just placed in a different position along that scale.[10] More recently, however, Dowling has abandoned this idea.[11] This change of opinion

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examples, but also with an instructor's manual (available from the author on floppy disc by request).

[9]James C. Bartlett and W. Jay Dowling, "Recognition of Transposed Melodies: A Key-Distance Effect in Developmental Perspective," *Journal of Experimental Psychology: Human Perception and Performance* 6 (1980): 501.

[10]W. Jay Dowling, "Scale and Contour: Two Components of a Theory of Memory for Melodies," *Psychological Review* 85 (1978): 341-354.

[11]W. Jay Dowling, "Melodic Contour in Hearing and Remembering

was reached in part because of more recent research showing that tonal context affects memory for contour. For example, in a 1991 experiment, Dowling asked listeners to discriminate between exact transpositions of a target melody and same-contour or different-contour lures. He used melodies of three types (strongly tonal, weakly tonal, and atonal), and he systematically varied the delay time between presentation of the stimulus and the subjects' response. Figure 2 summarizes his results in graphic representation.[12] After short delays, subjects discriminated targets from different-contour lures better than they did from same-contour lures in all three conditions: strongly tonal, weakly tonal, and atonal. The change in contour seemed to be the primary cue by which subjects discriminated between stimuli. By increasing the delay time, however, this difference tended to disappear for the strongly tonal melodies. With time, performance in the tonal condition improved for discrimination of same-contour lures. For atonal melodies, however, the longer delay time resulted in poorer discrimination. Dowling concluded that "listeners' ability to reject a different contour test item depended on tonal context, and not just on its difference of contour."[13] This result implies that contour and scale type are not independent components in memory for melody. It means too that the longer delay time actually made the task easier in the tonal condition; it gave subjects time to encode and process information other than simple

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Melodies," in *Musical Perceptions*, ed. Rita Aiello with John Sloboda (New York: Oxford University Press, 1994), 186. Though Dowling has abandoned this idea, others still espouse it. Witness, for example, the statement by Mariko Mikumo ("Encoding Strategies for Tonal and Atonal Melodies," *Music Perception* 10 (1992): 28): "These interpretations suggest that contour or shape and pitch or interval are independently handled as different features and, moreover, suggest that contour or shape recognition is dominant over pitch or interval recognition." Perhaps contour plays a stronger role in atonal melodies, thus accounting in part for her results.

[12]Figure 2 is reproduced from Dowling "Melodic Contour," 187. It summarizes results he reported in "Tonal Strength and Melody Recognition after Long and Short Delays." Perception and Psychophysics 50 (1991): 305-313.

[13]Ibid., 186.

contour. It is Dowling's hypothesis that contour information is the primary strategy for discrimination after short delays, and that interval information becomes available after longer delays; the ultimate result of this change in strategy is that intervals, in his opinion, are of primary importance in long-term memory for melodies.[14]

In evaluating the results of the experiment shown in Figure 2, Dowling does not consider that the two different classes of melodies (tonal and atonal) might necessitate two different types of listening strategies. Music theory teachers will suspect that subjects' differential ability to discriminate between target and lure in the two conditions probably indicates a difference in cognitive strategy that is dependent upon the strength of each melody type's tonal context. They might hypothesize further that subjects' ability to discriminate better in the tonal condition suggests that a different and more effective strategy has been used: namely, scale-degree information. To test this hypothesis, I designed and ran an experiment (#34) using three subject groups—absolute pitch musicians, non-AP musicians, and nonmusicians. The experiment's design was similar to Dowling's (discrimination between transposed targets and intervallically altered lures, tonal and nontonal) except that contour remained the same from target to lure and therefore could not be used at all as a discrimination cue. For all three subject groups (even nonmusicians), for both types of melody (even nontonal), subjects were able to discriminate at above chance levels, demonstrating that in the absence of contour cues, subjects were able to make use of other musical information in discriminating between target and lure. There were, however, differences in all three subject groups between listeners' performance in the tonal and nontonal conditions, with performance in the tonal condition significantly better.

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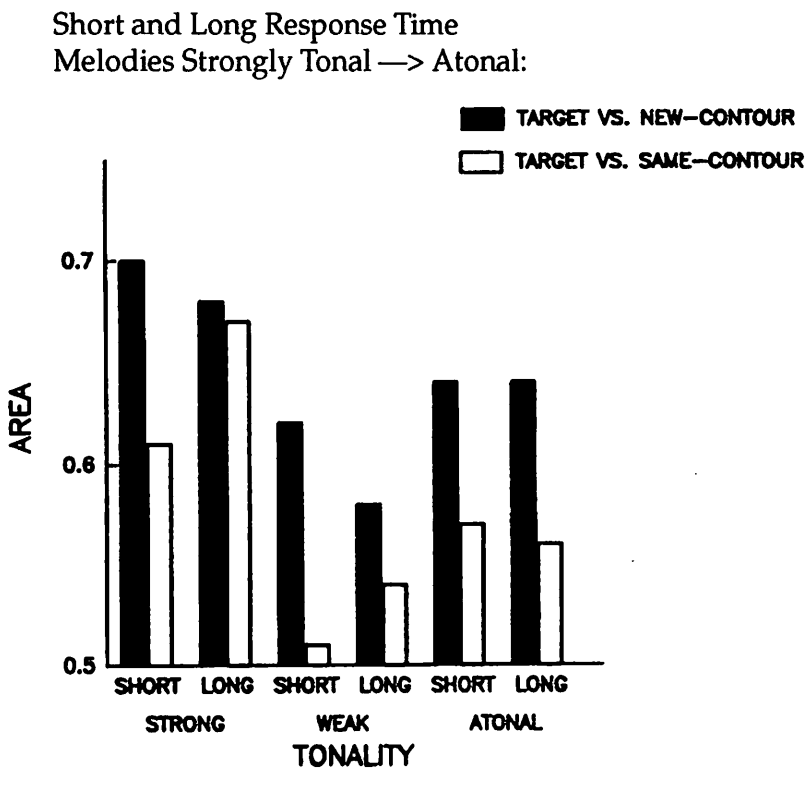
[14]Ibid., 183. Curiously, Dowling seems to contradict this position just two pages earlier, when he says (p. 181): "Since interval patterns most obviously remain constant through transposition, a good case can be made that they are the most fundamental. Nevertheless, I believe that melodies are remembered as ordered sets of pitches. The pitch framework provided by the scale temporarily fixes a set of pitches as landmarks in terms of which the pitches of the melody are organized and understood." I suspect that Dowling misspeaks here, and that by "pitch framework provided by the scale" he means scale degrees, not pitches.

Figure 2. Results from Dowling (1991)



This finding suggests either that listeners are better at the tonal task simply because they have more experience listening to tonal music, or that listeners are better at this task because they use a different and more effective method of encoding the melodic information in memory. Both alternatives may contribute to this finding. Even though both scale-degree and interval representations remain the same when melodies are transposed, scale-degree patterns are easier to remember because of "chunking" (that is, for example, grouping triadic embellishments into one "item" in memory, rather than several discrete units). Listeners using this strategy need not remember a string of unrelated intervals; rather, they remem-

ber the leaps as patterns within the underlying context of a familiar harmonic progression of just two or three chords. Stepwise patterns may also be remembered in relation to triadic arpeggiation, as stepwise filling in between chordal members, for example. The fact that this type of chunking is not available in nontonal contexts accounts, in part, for musicians' poorer performance in the nontonal condition, since listeners in that condition had to remember a succession of tonally unrelated intervals.

Musicians are conditioned to chunk melodies by harmonic function even when they practice arpeggios on their instruments—a common technical exercise. Although this cognitive strategy may not be explicitly articulated to music students in their early years of instrumental study, continued involvement with the harmonic language of tonal music in performance, sight reading, and memorization enables experienced performers not only to infer a tonal center from a melody as it is heard, but also to group leaps within triads and even to infer implied harmonic progressions.[15] This ability to chunk melodies by harmonic function would account, in part, for the large differences found between musicians' and nonmusicians' discrimination in the tonal condition of the experiment just discussed—a difference which narrowed considerably in the nontonal condition, where chunking by function was not an option.[16]

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[15]Research has also shown that musicians who effectively "chunk" by harmonic function are better sight readers. See, for example, John A. Sloboda, "Experimental Studies of Music Reading: A Review" in *Music Perception* 2 (1984): 222-236. Among the conclusions these researchers have reached are that good sight readers have better visual memories for notation, that they sense structural configurations in music, and that what they read is analyzed for its musical significance before the performer forms the appropriate motor commands.

[16]Investigators routinely divide subjects into "musician" and "nonmusician" categories, using the number of years of applied music study as a primary determinant. They frequently find significant differences in performance between these two subject groups, and some hypothesize that entirely different cognitive processes are at work in the two groups. Yet, consider that some of our music students (typically singers) do not begin applied music study until adolescence. If the number of years of instrumental study is used as the distinguishing criterion for subject grouping, these late-starting music students might fall

In related research, Lola Cuddy (#7) asked subjects to discriminate between a transposed target melody and a lure in which just one pitch had been altered by a semitone from a true transposition; in a later replication of the experiment, she altered the lure's one pitch by only a quarter tone! Cuddy's melodies were systematically constructed to conform to five different tonal strengths, ranging from strongly tonal to atonal, and she controlled for contour type. In all three subject groups, Cuddy found that discrimination of target melodies from lures was highly correlated to tonal strength. This was true even in the experiment using the quarter-tone alteration. Cuddy attributed the high level of discrimination in the strongly tonal condition to the fact that "perception of melody involves a sense of progression among notes . . . [which] is itself a sense of regular ebb and flow from a central nodal point (the perceived tonic)."[17] Thus, without using our terminology, Cuddy describes not a pitch-class nor an interval strategy, but rather a scale-degree strategy.

Cuddy's results show that the "ability to detect and implement harmonic structure exists in the average non-musician and this is a finding . . . that deserves further exploitation in adult music education."[18] Thus, the ability to make use of implied harmonic structure is available to most listeners; it is our job as teachers to enhance and reinforce it. One way to strengthen this ability is to employ pedagogical methods that allow students to perceive hierarchical relationships among scale degrees, and to hear scale-degree patterns that imply harmonic function, rather than methods that emphasize pitch-class identification or interval-based strategies for music hearing, singing, and dictation. As Cuddy's research showed, even listeners' ability to detect errors in intonation is affected by their ability to perceive underlying harmonic function within melodies.

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into the "nonmusician" group, and might tend toward different cognitive strategies than their peers who began instrumental study at a younger age.

[17]Lola Cuddy, "On Hearing Pattern in Melody," *Psychology of Music* 10 (1982): 9.

[18]Ibid., 3.

Let us return for a moment to the interval hypothesis for representing melodies in memory. This approach is taken by one prominent sight-singing text: Samuel Adler's *Sight Singing: Pitch, Interval, Rhythm.* Adler contends that "if you sing by intervals at all times, you will be able to read music that is tonal, modal, pantonal, nontonal, or a combination of all these means of organization."[19] In an experiment designed to tease apart scale-step strategies from interval strategies among different subject groups, Dowling (#8) presented listeners with stimuli like those shown in Figure 3: a chordal context followed by a novel melody whose scale-step identities were to be interpreted in the context of the key previously presented.[20] As this figure shows, the chordal context was either a closed progression (I-IV-V-I) in the key of the melody, or an incomplete progression (I-IV-cadential 6/4-V7) in the key of the subdominant, thus suggesting reinterpretation of the given melody's scale degrees in a new key. The melody was also followed by a tonic chord confirming the key. Listeners were asked to distinguish between exact transpositions of the target melodies and lures in which one note had been changed. In surprising results, Dowling found that inexperienced listeners discriminated between targets and lures in the shifting tonal context better than moderately experienced musical subjects.

Figure 4 shows Dowling's conclusions. He attributed his finding to the use of an interval-based listening strategy by inexperienced listeners, which would be unaffected by the change in context. Listeners with moderate musical experience, he hypothesized, were more likely to remember the melodies in their scale-degree context; shifting tonal context would therefore cause confusion errors among listeners in the moderately experienced subject group. Professional musicians, while "capable of scale-step representation, were able to use a flexible memory-retrieval system to avoid errors

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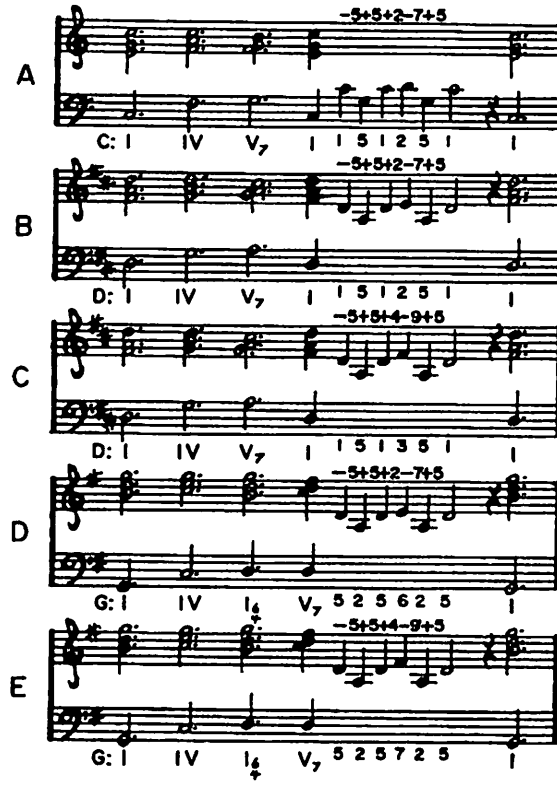
[19]Samuel Adler, *Sight Singing: Pitch, Interval, Rhythm* (New York: W. W. Norton & Company, 1979), x.

[20]Figure 3 is reproduced from "Context Effects on Melody Recognition: Scale-Step versus Interval Representations," *Music Perception* 3 (1986): 284.

Figure 3. Changing tonal contexts from Dowling (1986)



Examples of stimuli in Experiment 1: (A) A novel melody introduced with chordal context ending with the tonic (I) chord; (B) a same-context transposition of A; (C) a same-context imitation of A; (D) a different-context transposition of A; (E) a different-context imitation of A. The Roman numerals under the staves indicate the chord labels in the context; the small numbers above the melodies indicate the interval pattern in semitones; and the small numbers below the melodies indicate the scale-step values of the pitches. Note that transpositions preserve interval pattern exactly, and that the chordal context determines the initial scale-step values.

with changed context."[21] This, of course, is the point to be made in an effective theory pedagogy. Students need to develop a flexible memory retrieval system that is capable of both interval and scale-degree information. Absolute pitch musicians, for reasons to be discussed later, also need to develop a flexible system—one that uses not only the pitch-class information readily available to them, but also interval and scale-degree information that they often must be trained to use.

William Lake's article on "Interval and Scale-Degree Strategies in Melodic Perception" (#15) cites the Dowling study just described as his point of departure; Lake notes a tendency among his theory students to espouse one strategy strongly over the other, in spite of the fact that each system has some built-in problems:

> Neither approach is ideal for all situations. A scale-degree strategy is most suitable for tonal melodies. A typical problem for an interval thinker is to misjudge a leap and then remain off by a step; thinking scale degrees, however, allows quick reorientation after such a mistake. On the other hand, an interval strategy works best for atonal melodies and passages in tonal melodies that are modulatory or tonally vague. A typical mistake for a scale-degree thinker, who is not careful about specific intervals, is to alter notes to fit into some key (either imagined or no longer in force).[22]

Lake's classroom experience does not, however, fit with Dowling's "developmental" description of the interval strategy for less-experienced musicians and the scale-degree strategy for moderately experienced. In Lake's homogeneous group of students, both strategies exist. Indeed, he finds Dowling's developmental succession unconvincing; he notes "it seems unlikely that students would forget how to listen intervallically while they are learning scale-degree representations, only to recover that ability as professionals."[23] Lake suggests that teachers test students to discover whether they tend to hear by interval or by scale degree, then gear specific exer-

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[21]Ibid., 281.

[22]Lake, 57-58.

[23]Lake, 58.

Figure 4. Melodic recognition strategies from Dowling (1986)

Inexperienced listeners	———>	Interval series
Moderately experienced	———>	Scale degree patterns
Professional musicians	———>	Flexible system (interval <—> scale degree)

cises toward each type of listener to develop the other kind of skill. The remainder of Lake's article outlines what appear to be well-designed and specific exercises to develop these skills.

In addition to these exercises, the effective theory teacher will remember the power that "chunking" by harmonic function has for improving students' tonal memories. This skill may be one of the primary factors that differentiates musicians' performance from nonmusicians' in discrimination tasks involving memory for melodies. Classroom exercises designed around arpeggiations of triads and seventh chords in functional harmonic progressions reinforce scale-degree representations; they explicitly teach students to hear the underlying function of melodic arpeggiations, and teach students to group pitches by harmonic function in memory. These exercises may take the form of "echoes" sung by the class after hearing patterns sung by the instructor, then may progress to vocal improvisations by students upon familiar harmonic progressions. Students who improvise melodic patterns from harmonic progressions—vocally or on their instruments—are predisposed to hear melodies given in dictation as elaborations of common harmonic progressions.

Finally, teachers who regularly give melodic dictation should consider the strategies described by Gary Karpinski (#14). In his excellent and detailed exploration of music perception and its implications for melodic dictation, Karpinski cites a number of the studies already discussed here, as well as a few others, to support his step-by-step pedagogy for melodic dictation. In addition to drawing upon psychological experimentation in developing dictation strategies, he puts to use some of the methodology of the sciences,

by using the "case study" method to open his discussion of individual differences among students. Each case study subject has a distinctly different place where problems occur in the cognitive chain-of-events that occurs during melodic dictation. Like Lake, Karpinski recommends a series of pretests for each student to identify where in this chain the problems lie; then he recommends specific dictation steps and exercises for remediation that are geared to each problem.

Tonal Hierarchy and Closure

Music theorists have responded in several ways to the burgeoning number of cognitive experiments using musical auditory stimuli. One response—that just illustrated by the publications of Karpinski, Lake, and Larson—is to use this research to confirm one's own intuitions about musical structure and perception, and then to build upon firm cognitive ground a pedagogy that teaches these principles systematically. A second response is to use one's musical intuitions and expert knowledge of musical structure to serve as a critical "outside reader" for the psychologists—to question each assumption, each experimental design, and each conclusion from the musician's point of view. One area of cognitive research that has sparked much heated debate between music theorists and psychologists is the experimental study of perceived tonal hierarchy and closure. It is this body of work to which we turn in part three of the bibliography.

David Butler and Helen Brown's essay, "Describing the Mental Representation of Tonality in Music" (#27), brings together in one place a number of criticisms they have leveled elsewhere regarding the generally impoverished conception of tonality held by some music-psychologists—in particular their understanding of the scale as representative of tonality and their generally limited understanding of the contextual relationship that chromatic pitches have to the diatonic collection. On the subject of scale and tonality, for example, they note that:

> Scales are theorists' attempts to describe the pitch materials in music that already exists. The scale is a handy index of the pitch contents of some piece or pieces of music, but the scale's simplicity comes at a hefty price. The scale is a highly simplistic construction that fails to describe much of what is most important about pitch relations in tonal music.[24]

These statements are reminiscent of Butler's published criticisms (#23, 24) of the "tone probe" technique, used by psychologist Carol Krumhansl to test the perceptual validity of a tonal hierarchy. Figure 5 demonstrates the experimental method and results of her early tone probe studies.[25] Listeners heard a major or minor scale to establish a tonal context, after which a single tone was sounded; subjects were asked to rate how well the tone "fit in" to the tonal context previously heard. Multidimensional scaling techniques were used to create a hierarchy of pitch classes based on perceived distances from tonic. Butler and Krumhansl have engaged in a heated exchange of viewpoints over this issue and others. Not only does a scale fail to approximate a true "tonal context," according to Butler (#23), but there are also effects other than the perception of a tonal hierarchy that might influence listeners' judgments, thus weakening Krumhansl's conclusions. One such possible effect, for example, is the recency effect, which might cause subjects simply to prefer the note most recently heard.

Butler and Brown (#27) also report on their own research into key identification, based on Richmond Browne's (1981) discussion of the tonal implications of the diatonic set.[26] The authors have shown that listeners are better able to determine the implied tonic

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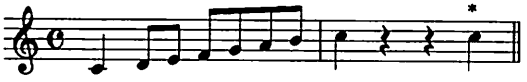
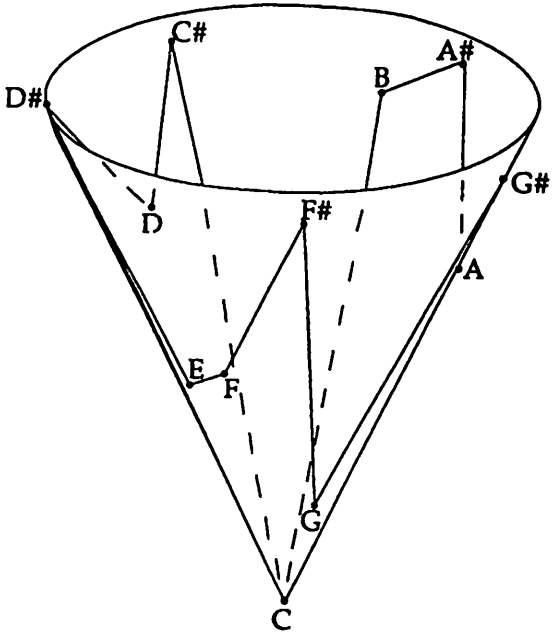
[24]David Butler and Helen Brown, "Describing the Mental Representation of Tonality in Music," in *Musical Perceptions*, ed. Rita Aiello with John Sloboda (New York: Oxford University Press, 1994), 195.

[25]The musical notation of Figure 5 is drawn from David Butler's "Response to Carol Krumhansl," *Music Perception* 7 (1990): 325. The conical representation is reproduced from his "A Study of Event Hierarchies in Tonal and Post-Tonal Music," *Psychology of Music* 18 (1990): 5.

[26]Richmond Browne, "Tonal Implications of the Diatonic Set," *In Theory Only* 5: 3-21.

Figure 5. Krumhansl's "tone probe" technique and tonal hierarchy





of a three-note set of pitches if it contains one of the rare intervals of the diatonic set (the tritone or the half step). Listeners can make this judgment rapidly and accurately; very few tones need to be present in the aural cue, so long as one of the rare intervals is represented. We can intuit the strength of this claim from the power of scale degrees 7 and 4 to predict resolution to 1 and 3, respectively. Butler and Brown also discuss the importance of pitch order in defining a key unambiguously. Brown's experimental research has shown, for example, that two different orderings of an identical pitch collection can suggest two different keys to listeners; a third reordering can be tonally ambiguous. Thus it is not only the presence of a diatonic collection in an experimental stimulus that determines listeners' perception of tonic, but also the order in which the tones of the collection are heard. This may suggest yet another reason to be wary of the randomly generated melodic dictation exercises seen in some computer-assisted instruction programs. Melodies generated by what Dowling calls "a random walk" on the diatonic scale[27] can be highly ambiguous tonally, even when they begin and end on the tonic pitch, since these random processes generally do not take into account the underlying implied harmonic progressions that are part of tonal melodic composition.

Butler and Brown close their article with a discussion of chromaticism.[28] The authors note that chromaticism has been equated with randomness or atonality in some experimental studies. Chromaticism in music, however, generally arises from specific compositional techniques: tonicization of other scale degrees, and mixture of the major and minor modes. Further, the so-called atonal stimuli in some experiments can, in fact, be heard tonally by experienced listeners. The process of chromaticism in tonal music, ac-

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[27]This is the method whereby diatonic stimuli were generated in Dowling's 1978 study, "Scale and Contour: Two Components of a Theory of Memory for Melodies" (note 10), though the interval sizes were also constrained in Dowling's study.

[28]These ideas are developed more fully in Helen Brown's "Cognitive Interpretations of Functional Chromaticism in Tonal Music," in *Cognitive Bases of Musical Communication*, ed. Mari Riess Jones and Susan Holleran (Washington, DC: American Psychological Association, 1992), 139-160.

cording to these authors, "involves much more than simply adding nondiatonic pitches to . . . dilute the strength of the prevailing tonality. Chromatic chords can lead skilled listeners to expect that some chords will form more appropriate resolutions than others and can thus be clear signals both of the key level and of unfolding harmonic events at the local level."[29]

Nicholas Cook's article on music and psychology (#28) is likewise an overview of various points of contention between theorists and psychologists, including the Krumhansl/Butler polemic just discussed. Cook addresses important issues impacting theories of musical structure as well. For example, he describes an experiment of his own (to which we shall return shortly) that calls into question the perceptual validity of hierarchical structures and the power of tonal closure; he discusses these issues in light of Lerdahl and Jackendoff's and Schenker's theories of tonal music.[30]

Cook also makes an important point about music listening that is often overlooked: musically educated listeners to some extent can choose to listen grammatically or can choose not to do so. This issue of cognitive choice has been addressed experimentally by Rita Aiello and her colleagues, who concluded that

> a high level of music training does not lead to a uniform way of perceiving music. Music education and training broaden students' base of musical knowledge . . . but musicians can use this knowledge selectively, according to the particular musical elements they choose to attend to. In listening to music, musicians focus on different musical elements and perceive the complexity of music according to individual cognitive strategies.[31]

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[29]Butler and Brown, 208.

[30]This experiment is published as "The Perception of Large-Scale Tonal Closure," *Music Perception* 5: 197-205. Cook discusses the results in light of Fred Lerdahl and Ray Jackendoff's *A Generative Theory of Tonal Music* (Cambridge, MA: MIT Press, 1983) and Heinrich Schenker's *Free Composition*, trans. and ed. by Ernst Oster (New York: Longman, 1979).

[31]Rita Aiello, J.S. Tanaka, Wayne C. Winborne, "Listening to Mozart: Perceptual Differences Among Musicians," *Journal of Music Theory Pedagogy* 4 (1990): 290-291.

Teachers, of course, should be aware of the potential for students to use different strategies (as Lake has pointed out); but in cases where a particular strategy is clearly more effective, teachers need to guide students toward that strategy. Further, because instructors are not always aware of which strategies students are using, they may wish to guide dictation practice in class to ensure that students are learning a full repertoire of strategies (e.g., "on this hearing, determine the meter and first and last scale degrees"). While choosing not to listen grammatically is an acceptable choice in some musical settings, our students need to be taught the cognitive strategies that will enable them to choose to listen grammatically in other settings.

We have discussed two possible ways in which music theorists might respond to music-cognitive research. A third way to respond is to design and run experimental research ourselves. This involves either some training outside our discipline—in experimental design and methods of data analysis, for example—or collaboration with colleagues in psychology. Music-cognitive experimentation enables music theorists to explore directly issues that arise in their aural skills, harmony, or analysis classes. While there seems to be a natural connection between empirical studies of music listening and professional instruction in music listening, the connection between empirical research and "written" theory instruction seems less obvious. Yet several experiments published in recent years pose important questions for the teaching of tonal harmony and analysis. The first of these, by Burton Rosner and Eugene Narmour (#21), investigated the relation between theories of harmonic closure and the perception of closure, citing in their discussion differences of opinion among music theorists over the years regarding such factors as the relative strength of plagal and authentic cadences, as well as the relative strength of scale degrees 7-8 versus 2-1. They trace these issues through the theories of Rameau and Riemann, Schoenberg and Schenker. In their experiment, nonmusician subjects heard two pairs of chords (each pair in a different key) and were asked to judge whether progression A or B sounded more closed. Among their results was the finding that plagal cadences were judged much weaker than authentic ones; subjects even preferred the progression III-I over IV-I for closure if the soprano voice leading was scale degrees 7-8. Melodic closure of 2-1 was not sta-

tistically different from 7-8, however. The authors conclude that "the message for Schenkerian theory seems to be that V-I as a generative harmonic constant is empirically tenable, whereas 2-1 as a melodic one . . . is not."[32]

The "message for Schenkerian theory" is not so positive from others engaging these issues. Karno and Konecni (#19) investigated the extent to which the rearrangement of formal sections in the Mozart G Minor Symphony, K. 550 would displease listeners unfamiliar with the work. These rearrangements varied in their nonconformity to tonal principles of structure: among the worst, a version that began with theme 1 from the recapitulation, followed by theme 1 and the closing theme from the exposition, then the development, the recapitulation's transition and closing theme, followed by the exposition's transition, then theme 2 from the recapitulation, ending with theme 2 from the exposition. This version, of course, would end in a different key from that in which it began.

Subjects rated each of five versions along three bipolar scales: pleasing/not pleasing, wish to own/do not wish to own, and interesting/not interesting. The authors reported that in two administrations of the experiment—one with nonmusicians and one with musicians—only when the symphony's original version was heard first was it preferred. When asked to rank the best version overall, the original was slightly preferred, but not by a statistically significant margin. Further, other odd contenders were rated almost as highly. The authors conclude that "it would seem that many (armchair-based) claims made by musicologists about the role of structure in a work's impact can be called into question by empirical research."[33] The authors acknowledge that theories of structure may be less usefully viewed as perceivable musical elements and more usefully seen as conceptual tools of composition. One might question the relationship between the task and the authors' conclusions, however, since they did not direct their subjects to attend to the

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[32]Burton S. Rosner and Eugene Narmour, "Harmonic Closure: Music Theory and Perception," *Music Perception* 9 (1992): 407.

[33]Mitchell Karno and Vladimir J. Konecni, "The Effects of Structural Intervention in the First Movement of Mozart's Symphony in G Minor, K. 550 on Aesthetic Preference," *Music Perception* 10 (1992): 72.

music's structural features in the experiment; that is, they did not ask subjects to rate the succession of melodies, their perception of narrative drama, or even their sense of completion. Rather, they focused on vague aesthetic notions of pleasingness and interest.

It is a music theorist, Nicholas Cook (#18), who explicitly asked listeners to judge tonal closure, among other elements, in short compositions from one to six minutes in duration. Noting the importance of monotonality and large-scale tonal closure as fundamental principles underlying most theories of tonal music, Cook designed an experiment using short compositions by Beethoven, Brahms, Haydn, and other common-practice composers, which were performed for subjects in two versions: the original and an altered version in which the second half of the work was transposed. Thus the altered compositions ended in keys different from those in which they began. Nineteen music students were played each of the composition pairs and asked to state which of the two versions they preferred in each of the following categories: pleasure, expressiveness, coherence, and sense of completion. Only for the very shortest of the compositions was there any significant link between tonal closure and aesthetic response. Cook asks the reader: "If the principle of tonal closure has little or no perceptual validity at the larger time scales found in most tonal compositions, is there not something radically wrong with a theory that ascribes fundamental aesthetic importance to it?"[34] Perhaps we should question whether Cook's question is really fair: do theories of tonal structure really intend to model aesthetic response? Cook's data analysis does not show that listeners are unable to discern that a composition has ended in a different key—only that listeners do not base their aesthetic response upon this criterion.

In his article's concluding discussion, Cook also raises this point, and notes that theories of musical structure need not be theories of musical perception as well. Theories of tonal structure are not scientific in intent, in Cook's opinion; rather, they are pedagogical, since it is essential that composers and performers alike have an abstract conception of a work's structure in order to control the composition's

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[34]Nicholas Cook, "The Perception of Large-Scale Tonal Closure," *Music Perception* 5 (1987): 203.

large-scale dynamic and temporal processes. Cook concludes by noting in connection with sonata form that

> the disposition of textures and thematic materials, the patterning of loud and soft passages and of high and low tessitura, the pacing of tension and relaxation—all of these aspects of a sonata are organized around the tonal plan and serve to project its structural closure in a directly perceptible manner. Hence if large-scale tonal relations are not in themselves audible, that does not necessarily mean that they are of no musical significance: it may just be that their influence on what is heard is an indirect one.[35]

Cook's empirical research into the perceptual validity of tonal closure does not invalidate what we do in harmony and analysis classrooms. As he notes, large-scale form is articulated by many perceivable features; these should be just as much a part of aural analysis as determination of the key of the second theme group. Further, since the students in our classrooms are primarily performers, our detailed examination of motivic unity and development, harmonic areas tonicized, phrase structure, and large-scale formal relations will help provide these young performers with a framework for memorization and with important conceptual information for musical interpretation.

Studies on Individual Differences

One final way in which music-cognitive research may help inform pedagogical method is in the study of individual differences among students. Within most music theory classrooms, there are distinct subgroups of students who share particular characteristics. One such characteristic is absolute pitch (AP) recognition. How should instructors handle dictation training for these students? At some institutions, these students are given a placement test and exempted from aural skills training altogether, because of their ability to sing at sight and to take accurate dictation. Yet if we ask AP students to listen to a harmonic progression and write Roman numerals only—without benefit of staff paper—they are often com-

[35]Ibid., 204.

pletely unable to do this, because they have not been trained to hear harmonic function. These students tend to transcribe letter names as quickly as possible, then return to their transcriptions and analyze for Roman numeral function. Even in the simplest of tasks, like interval identification, they tend to write (or think) letter names first and then analyze for the correct label. Some AP students cannot complete dictation tasks if a turntable or tape machine plays slightly fast or slow, resulting in a pitch level that is slightly sharp or flat from the key announced by the instructor.

Teachers of sight singing and dictation who have experienced these problems with AP students will be interested to know of an article entitled "Absolute Pitch as an Inability: Identification of Musical Intervals in a Tonal Context" (#35), which confirmed in an experimental setting exactly what we have observed in our classrooms. The experimenter, Ken'ichi Miyazaki, asked AP listeners to name melodic intervals in three key contexts: C Major, F# Major, and an entirely quarter-step-flat E Major. Each interval was preceded by a harmonic progression to establish one of these keys, and the first note of the interval was scale degree 1 of that key. Subjects were asked to name the interval, given only the choices minor third, major third, or perfect fourth.[36] The catch here is that the intervals heard were mistuned by 20-cent increments (a half step contains 100 cents).[37] Miyazaki scored an interval identification as correct if the interval heard was 40 cents wider or narrower than the interval named. Since an equal-tempered major third contains 400 cents, "major third" as a response in this experiment was judged correct if the interval played spanned anywhere from 360 to 440 cents.

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[36]Miyazaki notes one possible confounding variable in the design of his experiment: subjects were given the option of responding with interval names or with movable-do solfège names. However, many of the subjects were trained in fixed-do solfège and may not have understood how to use the movable syllables in this context.

[37]This type of experimental method has many precedents in perception research; it tests "categorical perception": the ability of perceivers to classify something that occurs along a continuum into discrete categories or classes. For example, a continuum of microtonal intervals exists between C and its octave above, but we tend to categorize these intervals perceptually into eleven discrete types.

Miyazaki found that AP subjects scored significantly lower and took significantly longer to respond in F# Major and the quarter-tone-flat E Major than in C Major. Further, the non-AP control group showed a considerably higher level of performance than the AP group across all key contexts. Some of the AP subjects showed considerable variability in their responses; their inconsistency was comparable to that of subjects in a related study who had had no musical training at all. The author hypothesizes that even though this task was designed to engage a relative pitch strategy, some AP listeners were unable to make use of that strategy. Miyazaki suggests that all AP listeners have some degree of relative pitch, but that this skill is less highly developed (or actually suppressed) in some listeners.

One music theorist doing collaborative research in a medical center has come to the same conclusion via considerably different experimental means. Ed Hantz and his collaborators (#32) discovered that absolute pitch listeners activate differently shaped brain wave forms (the P3 wave) in an interval identification task, or they do not activate this short-term "working memory" wave form at all. They hypothesize that AP listeners instead retrieve pitch names from long-term memory, then calculate interval size. This use of an AP strategy, even in the face of a relative pitch task such as interval naming, likewise suggests that some AP listeners are unable to choose a relative pitch strategy.

What are we to make of Miyazaki's finding that AP listeners were less well able to identify intervals from an F# tonic than from a C tonic? There is now a body of experimental evidence showing that AP subjects identify white-key pitches more quickly and accurately than black-key. Annie Takeuchi and Stewart Hulse (#36) hypothesize that there exists a window of opportunity in childhood—similar to the "critical period" for language acquisition—during which time absolute pitch recognition is acquired. Since children typically begin music instruction using the white keys of the piano and reading music with few accidentals, these are the pitches first acquired; it may be that the window of opportunity closes before pitch memory for the black keys is acquired. Older AP listeners may determine black-key note names by half-step displacement from the white-key notes, thus accounting for the slower recognition

times. Miyazaki concurs with the early music training hypothesis and notes that childhood AP acquisition probably results in suppressing the development of relative pitch. In fact, he goes so far as to suggest that children who have begun music lessons from an early age should be given explicit training in relative pitch—a "remedial treatment for children having AP."[38]

In what other sense might absolute pitch be regarded as an "inability"? Recall my experiment on recognition of invariant-contour melodies described previously (#34); subjects heard a tonal or atonal melody, followed by either an exact transposition or altered transposition, then were asked to make a same/different discrimination. AP subjects scored significantly higher than non-AP subjects in discriminating transposed tonal melodies from same-contour lures. In the nontonal condition, however, this advantage completely disappeared. In fact, there was no significant difference between AP musicians and nonmusicians' performance in the nontonal condition. Like Miyazaki, I conclude that AP listeners are able to use a combination of absolute pitch and relative pitch strategies, depending upon the task. The data from this experiment suggest that AP musicians use pitch-class and scale-degree information primarily, with less reliance upon memory of interval successions. Upon hearing a transposed tonal comparison melody, AP subjects might choose to transpose the original melody's remembered pitch classes to a new key or—more likely—they might shift to a scale-degree recognition strategy, which is invariant across the key change. For the nontonal melodies, however, AP subjects may have found themselves unable to transpose quickly and accurately enough to discriminate transposed targets from lures. Because of the nontonal context, they were unable to use a scale-degree strategy, and the results suggest that they were less able to use an interval strategy. I conclude that at least some of the AP subjects were unable to use a flexible system that incorporated interval information, since their ability to discriminate declined so markedly in the atonal condition.[39]

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[38]Miyazaki, 70.

[39]Elizabeth West Marvin, "Cognitive Strategies for Recognition of Invariant-Contour Melodies: Tonal Context Affects Performance Among

What implications do these studies have for theory pedagogy? In a paper presented at the Second International Conference for Music Perception and Cognition, Philip Baczewski and Rosemary Killam (#30) reported on the "extreme and negative reactions" of their AP subjects who were instructed during an experiment to notate a two-voice dictation in a key other than that in which it was played.[40] Clearly, these musicians had never been asked in a classroom situation to think and write in other keys. The preponderance of data reported in AP experiments suggests that few absolute pitch subjects have been explicitly trained in relative pitch listening strategies. These musicians simply rely on their AP, whether the AP seems to be "working" for them or not. Research suggests that AP musicians with under-developed relative pitch skills will encounter cognitive difficulties when performing at Baroque pitch, for example, or on non-equally tempered instruments; they may struggle when asked to transpose from score, and have difficulty hearing transposed motivic relationships in nontonal music.

Responsible aural skills teachers need to address this deficiency by incorporating into their lesson plans specific exercises to help AP listeners develop their relative pitch skills. For example, many classroom exercises in the aural skills classes can be designed to promote maximum musical interaction between teacher and student without the intrusion of any staff notation at all. Tonal echo patterns and vocal improvisation exercises upon simple harmonic progressions can be sung in a variety of keys on scale-degree numbers or (movable-do) solfège syllables without notation. Exercises in which the instructor sings chordal arpeggiations on a neutral syllable, asking students to echo back by singing on scale-degree numbers or solfège syllables, encourage students to map these patterns onto harmonic function rather than note names. These are good preliminary exercises to stretch AP students' relative pitch

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Musicians and Non-Musicians," paper presented at the annual meeting of the Society for Music Perception and Cognition, Philadelphia, PA, 1993.

[40]Philip Baczewski and Rosemary N. Killam, "Perception of a Musical Construct by Musicians with Absolute Pitch," paper presented at the Second International Conference on Music Perception and Cognition, Los Angeles, CA, 1992.

skills. In addition, from the first day of the freshman year, students should regularly be asked to sing melodies at sight in keys other than notated. This technique makes no difference to relative pitch students, but it begins to stretch the AP students into new ways of thinking about musical relations while the melodies are fairly simple and diatonic, and it has the added advantage of allowing instructors to move melodies notated in tessituras too high or too low into more comfortable keys for singing.

In dictation classes, melodies may be given without announcing a key at all during much of the freshman year. Students would be expected to provide rhythmic notation and scale-degree numbers only. This dictation strategy views transcription onto the staff as a final extra step. Once the tune's scale-degree structure has been notated numerically, teachers may call out any key at random and ask students to notate the melody in this key. This dictation procedure brings to mind Gary Karpinski's article (#14), discussed earlier.[41] His step-by-step dictation pedagogy is excellent for AP students as well as for remedial students, because it explicitly exercises relative pitch relations. Finally, as instructors choose keys for singing and playing dictation, the white-key/black-key finding ought to be kept in mind; music-cognitive research suggests that black-key keys may be more effective in forcing AP students to rely upon relative pitch, though these keys may be more difficult at first.

Before leaving the subject of individual differences among students, let us turn to the question of sex differences. Are there possible differences between the ways men and women perform mu-

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[41]Another interesting parallel with the Karpinski research may be found in Daniel Levitin's "Absolute Memory for Musical Pitch: Evidence from the Production of Learned Melodies," *Perception & Psychophysics* 56 (1994): 414-423. Karpinski argues that one distinct type of dictation problem is the ability to sing back a melody accurately, but the inability to associate scale-degree numbers or solfège syllables with the melody just sung—that is, the inability to assign to each pitch a meaningful name. Levitin shows that even nonmusicians have the ability to retain melodies *at pitch*, which he demonstrates by having subjects sing pop music songs they know well. Even subjects with no musical training often sing these tunes in the correct key; they have the ability to remember a pitch and key, but they do not have the training (or perhaps the ability) to assign a meaningful name to that pitch.

sic-cognitive tasks? Indeed, there is a body of research in sex differences outside of our field. Doreen Kimura's 1992 article in *Scientific American* (#39) provides a concise summary of this research. Figure 6 summarizes the cognitive tasks in which sex differences have been shown. In related research, Thomas Bever (#37) demonstrated that in spatial navigational tasks women and men perform equally well, but that they use different mental strategies to keep track of their positions. After navigating a life-size maze, men were better able to identify a map of the route just traversed; women, on the other hand, were better able to place in the correct order a series of pictures showing items passed along the way. Bever concluded that women more often navigate through a maze by means of remembered landmarks, while men use global maps constructed in memory by means of directional vectors. Are there any implications for music listening here? Can memory for music be considered a spatial task that might exhibit sex differences in strategy?

A few links between spatial perception and music study have been found previously. For example, Marianne Hassler and her colleagues (#38) have undertaken a longitudinal study of young children through puberty; these researchers have found significant correlations between musical talent and high visual-spatial ability as measured by standardized tests. Interestingly, the correlation is higher among children who compose or improvise than among other young performers. No sex differences were found in children before puberty, but after puberty spatial visualization was stronger in females than males, leading to a sex difference in favor of the females. The issue of whether music study by children somehow improves spatial cognitive functioning is the subject of an on-going series of experiments by Frances H. Rauscher and her colleagues at the University of California at Irvine.[42] This group of researchers studied three-year-olds, two-thirds of whom were given eight months of music training (group singing and private keyboard lessons). When tested on a spatial reasoning task that required them

[42]Rauscher's research has been reported widely in the popular press; see, for example, "Brain Music: Listening to Intricate Mozart Melodies Can Improve Ability to Learn" by Richard A. Knox, which appeared in the Rochester, NY *Democrat and Chronicle* (Monday, September 12, 1994) as a reprint of a *Boston Globe* story.

Figure 6. Cognitive tasks exhibiting sex differences (Kimura, 1992)

Tasks favoring women's performance:

- tests of perceptual speed (such as matching items)
- ideational and verbal fluency
  (for instance, listing words beginning with the same letter)
- precision manual tasks (placing pegs in holes)
- mathematical calculations

Tasks favoring men's performance:

- spatial tasks (such as mentally rotating an object)
- target-directed motor skills
- disembedding tasks (finding a simple shape in a complex form)
- mathematical reasoning

to assemble picture puzzles, the test scores of children engaged in music training had dramatically improved after eight months, while the other children showed no significant improvement. The researchers hypothesize that spatial tasks like the assembling of puzzles are similar to music performance, since both require "forming an ideal mental representation of something which is eventually realized."[43]

To explore the issue of spatial representation of music in memory among college-aged adults, I ran an experiment (#40) designed to engage listeners in a spatial task using musical stimuli. As in previous experiments, listeners heard an unfamiliar seven-note tonal melody, immediately followed by a comparison melody. Figure 7 gives a sample standard melody followed by four possible comparison melodies. The task was to identify on an answer sheet whether the comparison melody was an exact transposition, called "same," or whether it was a spatial transformation: backwards, inverse, or backwards-inverse presentation (in other words: retro-

[43]Ibid.

grade, inversion, or retrograde inversion). Figure 8 presents the results, ranked from easy to difficult for male and female musicians. Musicians were able to discriminate in all four conditions at above chance levels. There were no significant sex differences in the T- and I- conditions. There was, however, a significant difference in the R-condition, with males better able to discriminate; there was a strong, though not statistically significant, trend in favor of males' discrimination of the RI-transformation as well. To summarize, then, significant differences were found between the sexes, but only for the transformations that reversed the pitches' temporal order.

Subjects were also asked to complete a questionnaire; among the questions asked was a strategy question. Subjects' responses were divided into three categories: memorization of distinct "segments" (a landmark strategy), visualization of the entire "contour" or shape of the melody (a vector strategy), and "other." This categorization revealed more flexibility in strategy among males; over

Figure 7. Melodic transformations from Marvin (1993)

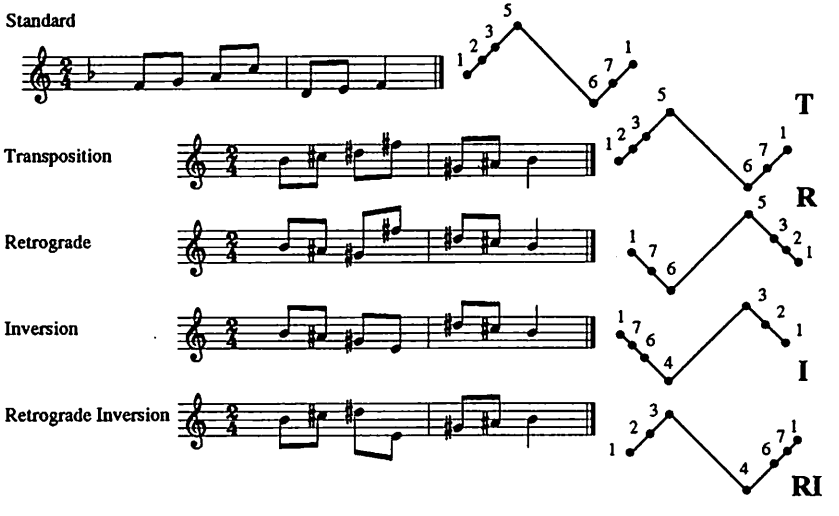
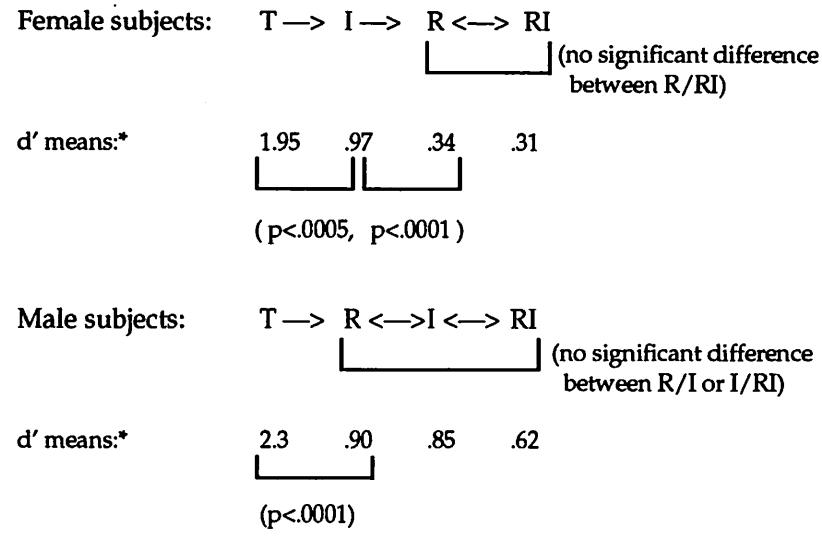


Figure 8. Marvin's ranking of transformations (easy to difficult)



*D-prime values control for subjects' possible guessing strategies by plotting correct identifications (hits) against false positives (false alarms). They range in value from -3.29 to +5.73, where 0 represents no discrimination (chance). D' values used here were derived from the conversion tables in M. J. Hacker & R. Ratcliff, *Perception & Psychophysics* 26 (1979): 168-170.

half reported a segment strategy, one-third a vector strategy, and the remainder "other." Two-thirds of the women, on the other hand, reported a segment strategy, with the remaining third divided between "contour" and "other" strategies. Statistical analysis of these data suggests that males and females generally do use different cognitive strategies to complete this task.

The poorer discrimination rates by females in this experiment can be attributed, in part, to the fact that a segment (landmark) strategy is a less effective strategy in this task than vector representation (contour), since some segments remain invariant under retrograde and retrograde inversion. In Figure 7, for example, the first melodic shape would be represented in scale degrees as 1-2-3-5-6-7-1 and the retrograde inversion as 1-2-3-4-6-7-1; note that they both

begin with scale degrees 1-2-3, and end with 6-7-1. If those were the segments that the listener chose to remember, confusions between same and backwards-inverse would result. The same problem arises in the backwards and inverse conditions, with 1-7-6-5-3-2-1 and 1-7-6-4-3-2-1. Further, a melody like 1-2-7-5-4-2-1—which has 1-2 at the beginning and 2-1 at the end—would result in errors in same/retrograde discrimination if the listener chose the beginning/ending dyads to remember as landmarks. These two factors, then, may account for women's lower scores in the R- and RI-conditions, since the female subject group more frequently reported using the landmark strategy. The more effective strategy for this task takes into account the contour of the whole, not just the ups and downs, but also the relative distance up and down: a vector representation.

If men and women are cognitively predisposed to perform spatial transformations on remembered melodies in fundamentally different ways, then teachers of aural skills need to broaden their methodologies to embrace both ways of thinking about (and hearing) such transformations—either as global maps or as more localized landmarks. In the task of identifying the new key in a piece that has modulated, for example, the teacher who explains the strategy only in the global terms of memorizing the initial key, retaining it in memory, and then comparing it to the new key may be teaching with a male bias. Presenting also an alternative landmark-based strategy that focuses on reinterpretation of scale degrees during the modulatory shift might be more inclusive. In harmonic dictation, a global strategy might focus first on large harmonic goals, while a landmark strategy might take note of chord qualities, altered tones, or nonharmonic tones along the way. These examples are not intended to imply that there is unequivocally one "female" way to hear a relationship and another "male" way; rather, it is to assert that different classes of listeners may process music differently (absolute pitch listeners may use still another strategy). The effective teacher should present several alternative methods.

Let us close by returning to Cook's essay on music and psychology (#28) because it draws important distinctions between what psychology and music theory should be and should do. Cook notes that

> musical perception is pluralistic and fluid; listeners make use of multiple cognitive frameworks . . . and shift their strategies from one moment to the next. . . . A psychological model of perception needs to embody these characteristics. But there is no reason why music theory should be like this. . . . The aim of music theory, then, is to go beyond perception.[44]

While theories of musical structure need not model cognitive processes, an awareness of these processes can considerably ease a music theory teacher's task. Good experimental research in music cognition can make music theory instructors aware of the ways in which our students are predisposed to hear and interpret music; it can remind us that different classes of listeners (musicians and nonmusicians, for example) hear and interpret music using entirely different cognitive strategies. The more our pedagogical methods can build upon students' predispositions, yet lead them toward strategies that have been shown most effective for skilled musicians, the better our teaching will be.

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USES OF THE HARMONIC 6/5 IN SIXTEENTH-CENTURY STYLE COUNTERPOINT

John Hanson

Traditionally included among theory courses offered as part of the collegiate music curriculum is the study of the craft of counterpoint. Such a study includes surveys of common techniques and procedures along with the presentation, illustration, and use of individual devices that often are style-specific.

Over a period of time a person involved in counterpoint pedagogy inevitably becomes interested in accumulating materials that can clarify and augment information as it is presented in texts for stylistic-oriented courses, and this article reflects such an interest. In an introductory study of sixteenth-century (Palestrinian) style counterpoint it is common to start with aspects of melody and rhythm, proceed to text setting and two-voice texture, and then move on to devices associated with three- (and more) voice texture. One of these latter devices is the harmonic combination of the 6th and the 5th above the bass (designated as "6/5" in this article), interesting because of the consonance/dissonance anomaly, because it is found in various guises in Palestrinia's music, and even because of its connection to seventh-chord vocabulary of the subsequent tonal period. In texts dealing with sixteenth-century style, the content and the amount of coverage given to the 6/5 vary quite widely. Therefore, on the basis of a survey of 6/5's in three- and four-voice sections/movements of the masses of Palestrina and of presentations found in seven counterpoint books, I am suggesting a categorization of various uses that should be helpful for both teacher and student. The categorization provides an overview of contextual uses

as found in the masses and can serve as a check list when the 6/5 is being studied and when information from texts is being employed.

Specifically surveyed were the discrete three-voice sections (such as the *Crucifixus*, *Pleni sunt coeli*, and *Benedictus*) of *all* the masses and all the four-voice movements of the 40 four-voice masses.[1] In the four-voice movements, examples of 6/5's in both three-voice texture and four-voice texture were enumerated. Not included in the study were 6/5's in textures of more than four voices, since generally these thicker textures are less relevant to an introductory sixteenth-century course. In the 2,894 measures of the three-voice sections, 71 6/5's were found; in the 18,166 measures of the four-voice masses, 319 6/5's were found in three-voice texture and 205 were found in four-voice texture. The total of 595 was reduced by twelve weak-beat placements which are acknowledged in a category but which were not included in the total of 583 strong-beat placements. The books that were surveyed include those by Bassett, Benjamin, Gauldin, Jeppesen, Merriman, Smith, and Soderlund.[2] Six are texts; in the case of Jeppesen, his work The *Style of Palestrina and the Dissonance* is referenced because it contains examples of 6/5's from literature, whereas the 6/5 is not discussed in his book entitled *Counterpoint*.[3]

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[2]Leslie Bassett, *Manual of Sixteenth-Century Counterpoint* (New York: Appleton-Century-Crofts, 1967); Thomas Benjamin, *The Craft of Modal Counterpoint* (New York: Schirmer Books, 1979); Robert Gauldin, *A Practical Approach to Sixteenth-Century Counterpoint* (Englewood Cliffs, NJ: Prentice-Hall, 1985); Knud Jeppesen, *The Style of Palestrina and the Dissonance*, 2nd rev. and enl. ed. (Copenhagen: E. Munksgaard, 1946); Margarita Merriman, *A New Look at 16th-Century Counterpoint* (Washington, DC: University Press of America, 1982); Charlotte Smith, *A Manual of Sixteenth-Century Contrapuntal Style* (Newark, DE: University of Delaware Press, 1989); and Gustave Soderlund, *Direct Approach to Counterpoint in 16th Century Style* (New York: Appleton-Century-Crofts, 1947).

[3]Knud Jeppesen, *Counterpoint*, trans. Glen Haydon (Englewood Cliffs, NJ: Prentice-Hall, 1939). Other sources consulted were H. K. Andrews, *An Introduction to the Technique of Palestrina* (London: Novello and Company, 1958); and Harold Owen, *Modal and Tonal Counterpoint* (New York: Schirmer Books, 1992).

The categorization is based on four factors. The first is placement of the 6/5 in relationship to beats, differentiating between the very common strong-beat placement (within the context of 4/2 meter as generally employed in the pedagogy of sixteenth-century counterpoint) and the occasional weak-beat or off-beat occurrence. The second through fourth factors reflect linear considerations: the member of the 6/5 having preparation and resolution, the melodic approach of the bass (lowest voice) to the 6/5, and the melodic departure of the bass from the 6/5. Two other factors include the specific interval size of the 5th of the 6/5 (perfect or diminished) and occurrences within sections in triple meter. Examples of the most common use (entitled Category 1, Normative) share the following characteristics: they occur on a strong beat (beat 1 or 3 in 4/2); the fifth is prepared by the same note in the same voice; this prepared 5th resolves down by step; and the bass of the 6/5 is left by ascending step, with the chord of resolution being the 5/3 position of a major or minor triad, on the next weak beat (2 or 4). The remaining categories provide for possible but less frequent alternatives: 2) like category 1, but with a modification in the resolution of the 6/5; 3) the bass to and/or from the 6/5 is a common tone; 4) the *6th* is prepared and resolved; 5) the placement is other than on a strong beat 1 or 3; 6) any other less usual occurrence.

These categories, along with subcategories and conditional factors, are itemized in Figure 1. For each subcategory the number of examples found is given, along with the percentage that number is of the total of 583. Because the categories group related linear motions and are not based only on number of occurrences, successive entries do not in all cases reflect a descending numerical ordering. Therefore it is necessary to observe the numbers and percentages when checking for relative amounts of usage. Percentages are rounded to the nearest whole number. No percentage is given if there are only one, two, or three occurrences; taken together, these instances total approximately 2 1/2% (see Fig. 1).

Examples 1-6 are notated illustrations from the masses and from texts of each of the subcategories indicated in Figure 1. Further information includes Figure 2, which shows numbers of occurrences in the masses by respective texture, and Figure 3, which cross-indexes the six categories with all of the notated examples of 6/5's found in the seven selected texts.

Figure 1. The categories of uses of the harmonic 6/5 in Palestrina masses

	In Pales.
1. Normative. On strong beat (first or third half note in 4/2 bar); 5th of 6/5 is a perfect fifth; 5th is prepared by same note in same voice, and resolves down (as in suspension figure); bass (i.e. lowest-sounding voice) of 6/5 is left by ascending step; resolution is to a major or minor triad in 5/3 position, on second or fourth half note.	Approx. %
a. Bass of 6/5 approached by ascending step.	207 / 36
b. Bass of 6/5 approached by ascending leap.	28 / 5
c. Bass of 6/5 approached by descending leap.	83 / 14
c. variant: descending leap is filled in with passing motion.	35 / 6
	[61]
2. Like 1, but with a modification in the resolution of the 6/5.	
a. Bass of 6/5 left by ascending step to diminished triad in 5/3 position.	41 / 7
a. variant: bass left by ascending leap to diminished triad in 6 position.	2
b. Bass left by ascending step to major or minor triad in 6 position or with 5-6 motion	11 / 2
c. Note values of 6/5 are augmented, so the resolution is delayed until the next strong beat.	5 / 1
d. Bass left by descending leap to 6 position.	2
e. Bass left by descending step to 6 position.	1
f. Bass left by ascending leap.	0
	[10]
3. Bass to and/or from 6/5 is common tone. On strong beat; 5th prepared.	
a. Bass of 6/5 approached by ascending step, continued by common tone; 5 of 6/5 proceeds to consonant 4th.	16 / 3
a. variant: bass approached by descending leap.	1
b. Bass to and from 6/5 is common tone; 5 proceeds to consonant 4th.	23 / 4
b. variant: bass enters at point of 6/5 after a rest.	3
c. Bass of 6/5 approached by common tone but left by descending leap; not to consonant 4th.	6 / 1
d. Bass approached by common tone, left by ascending step; not to consonant 4th; not to avoid parallel fifths.	32 / 5
e. Bass approached by common tone, left by ascending step; not to consonant 4th; ascending 5-6-5 voice leading to avoid parallel fifths.	31 / 5
	[18]

(continued)

Figure 1. (cont.)

4. The 6th is prepared and resolved. On strong beat.

a.	Bass approached and left by descending step; descending 5-6-5 voice leading to avoid parallel fifths.	17 / 3
b.	Bass approached by descending step, left by ascending leap; descending 5-6-5-3 voice leading to avoid parallel fifths.	5 / 1
c.	Bass approached by descending step, continued by common tone; descending 5-6-5 voice leading to avoid parallel fifths.	1
d.	Bass approached by ascending leap, continued by common tone; does not have 5-6-5 voice leading.	3
e.	Bass to and from 6/5 is by common tone; 5-6-5 is neighbor motion.	1
f.	Bass approached by common tone, left by descending step; does not have 5-6-5 voice leading.	1
		[4]

5. Placement other than strong beat.

a.	On second or fourth half note in 4/2 bar	*(3)
b.	In quarter-note motion.	*(9)

*Not counted in the total of 583, as there may be other examples in addition to these 12.

6. Less usual occurrences.

a.	5th of 6/5 is a diminished fifth (therefore dominant-seventh sound results).	**15/ 3
b.	6/5 occurs in triple meter.	**13/ 2
c.	Free treatment; some aspect of voice leading is very unusual.	0
		[5]
	(one every 36 bars)	583

**Counted only here in category 6; but of 6a 11 are 1a, 1 is 1b, 1 is 1c, 1 is 1c var., 1 is 2b. Of 6b 4 are 1a, 2 are 1c, 3 are 2a, 2 are 3b, 1 is 3d, 1 is 3e.

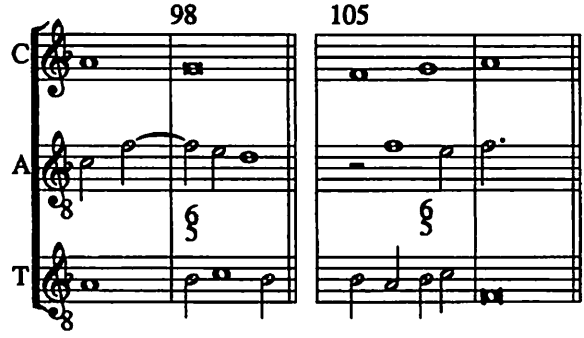
The first category, *Normative*, reflects the large percentage of occurrences of this type (61%) in the surveyed masses; also, this use is illustrated in six of the seven books (all except the Jeppesen). The subcategories differentiate only the *approach* to the bass note; the normative departure is by ascending step (see Ex. 1). Examples 1a, 1b, and 1c are from the Palestrina masses surveyed. Each example is first labeled with four abbreviations (such as the label for 1a - "S, 5, AS, AS") to indicate the respective items of categorization: strong (S) or weak (W) beat placement; member prepared (5 or 6); approach to bass; departure from bass—ascending (A), descending (D), step (S), leap (L), common tone (CT). The next line of the example label gives the source of the example (P = Palestrina), and the third line gives the specific mass (M) when the example is from the surveyed sources. For pedagogical reasons, examples are chosen mainly from three-voice textures; the few in four voices are for the sake of comparison or when a three-voice example is not available. Even though the categorization is based on linear considerations, normative use acts and sounds like a II 6/5 if the context were tonal.

Category 2 provides acknowledgment of the 10+% of the total that are essentially normative in the preparation and taking of the 6/5 but exhibit a difference in resolution (see Ex. 2). Whereas the category 1 use often implies a tonal II 6/5, those in 2a imply a tonal IV 6/5 because of the scalar placement necessary to achieve resolution to the diminished triad in root position. The other subcategories should be clear as defined and illustrated. The indication of the approach to the bass is left blank in the labels for Example 2, as the subcategories are differentiated only by the nature of the departure from the bass. Note that for Example 2d the second illustration is from the Smith text and for 2e from the Gauldin text, but for neither is a source identified in their texts. These uses are very rare, as in the survey only two are in subcategory 2d and one is in 2e. For 2f the example is by Palestrina as cited in the Soderlund but is not from the sources surveyed in this study.

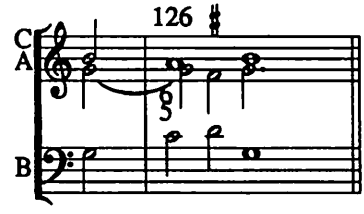
Category 3 occurrences, constituting 18+% of the total, are those in which the bass is approached and/or left by common tone (see Ex. 3). In subcategory 3a the *departure* from the bass is by common tone, in subcategory 3b *both* approach and departure are by common tone, and in subcategories 3c, d, and e the *approach* is by com-

Example 1. Category 1: Normative

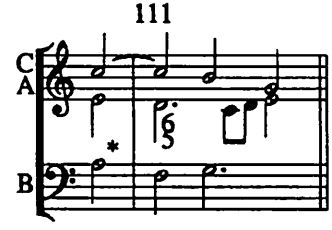
1a. S, 5, AS, AS
P. v.IV, p.39
M. Inviolata; Crucifixus



1b. S, 5, AL, AS
P. v. I, p.15
M. Ecce sacerdos magnus; Crucifixus



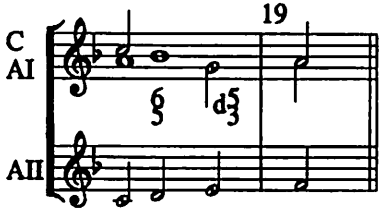
1c. S,5,DL,AS
P. v.I, p15
M. Ecce sacerdos magnus; Crucifixus



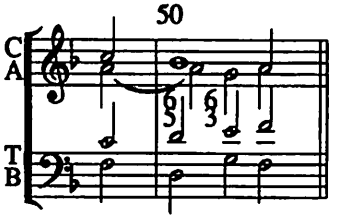
variant: * descending leap approach may be filled in with PT

Example 2. Category 2: Normative but with a modification in the resolution of the 6/5.

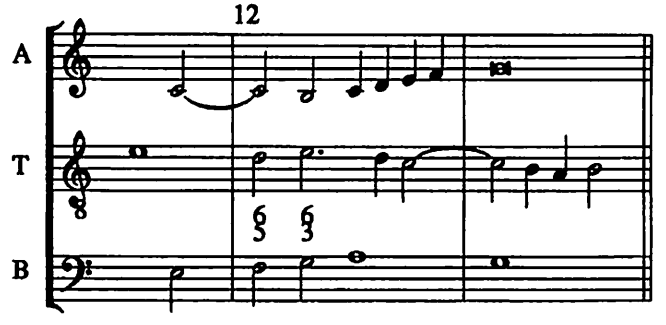
2a. S, 5, ( ), AS to dim. 5/3
P. v. I, p.116
M. Gabrieli Archangelus; Benedictus



2a var. AL to dim. 6/3
P. v.XXVIII, p.24
M. Descendit Angelus Domini; Sanctus



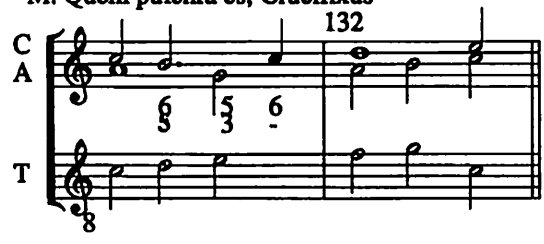
2b. S, 5, ( ), AS to 6 or 5-6
P. v. VI, p 102
M. L'homme arme; Gloria



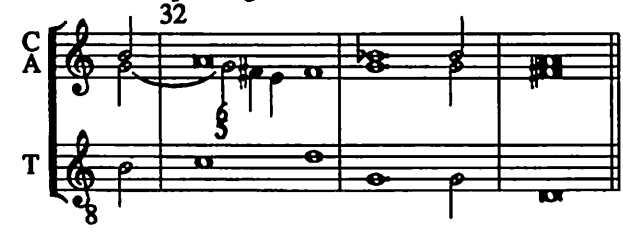
(continued)

Example 2. (cont.)

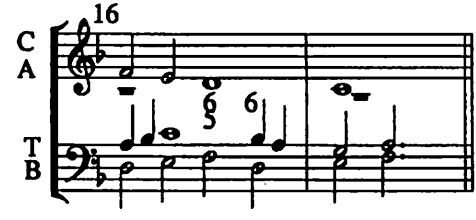
P. v. XXI, p.89
M. Quem pulchra es; Crucifixus



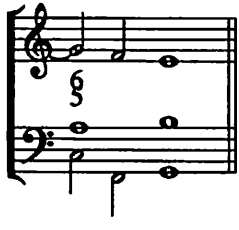
2c. S, 5, ( ), AS in Augmentation
P. v. XV, p. 67
M. Panis quem ego debo; Benedictus



2d. S, 5, ( ), DL to 6
P. v. IV, p.35
M. Inviolata; Credo



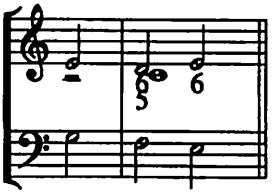
Smith (1989) p.79 (no source)



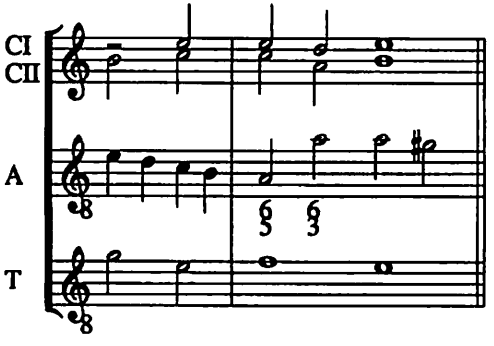
(continued)

Example 2. (cont.)

2e. S, 5, ( ),DS to 6
Gauldin (1985) p. 93
Example 9-9G (no source)



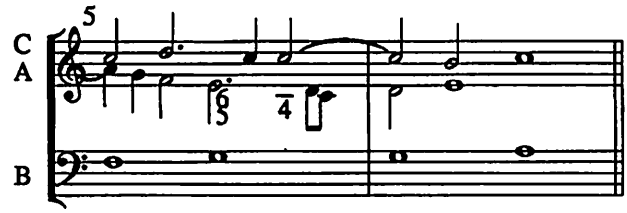
2f. S, 5, ( ),AL
Soderlund (1947) p. 96
Example from P. v. XXIII, p. 120.



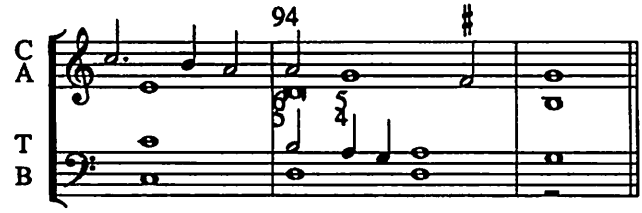
mon tone. Occurrences in subcategories 3a and 3b are those where the 5th of the 6/5 descends by step over the sustaining bass, thus exemplifying the so-called consonant 4th figure (suggesting a kind of embellished cadential 6/4). Both a three-voice and a four-voice example are given for subcategory 3a, and the 3a variant shows the descending-leap bass approach. While all other examples in category 3 are from the surveyed masses, the second example for the 3a variant is from the Jeppesen book *Counterpoint*. It is included here to show that Jeppesen used a 6/5 with continuation to a consonant 4th in a fourth-species exercise. Although his accompanying textual explanation points out the consonant 4th, no mention is made of the 6/5 combination. In subcategory 3c a stepwise descent from

Example 3. Category 3: Bass to and/or from 6/5 is common tone

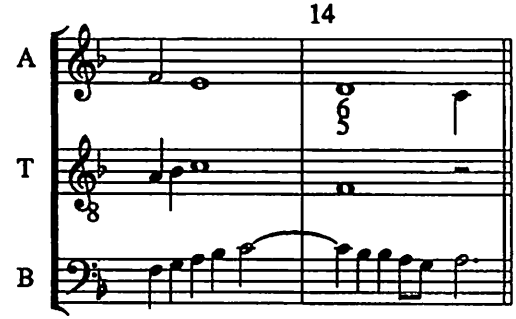
3a. S, 5, AS, CT to C4
P. v. XXIII, p. 208
M. In Minoribus Duplicibus; Agnus (3-vc. example)



P. v. I, p. 70
M. Virtute magna; Gloria (4-vc. example)



3a. var
S, 5, DL, CT to C4
P. v. XXVIII, p. 5
M. Descendit Angelus Domini; Gloria

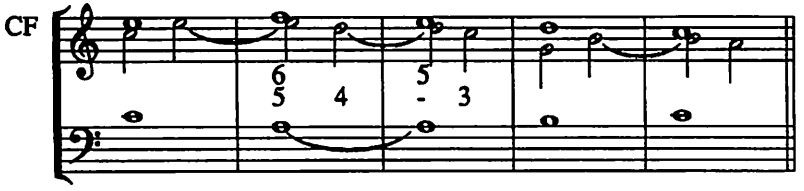


(continued)

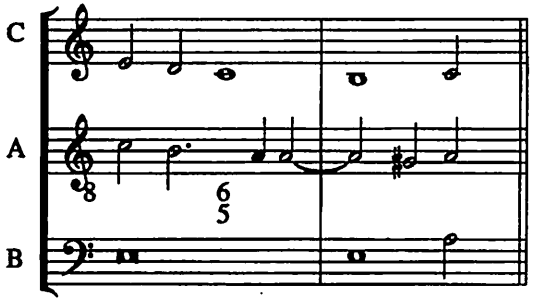
Example 3. (cont.)

(3a. var)

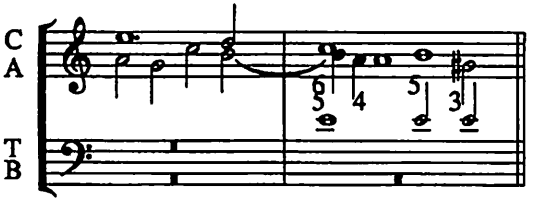
Jeppesen (1939) p. 189 (4th-species counterpoint)



3b. S, 5, CT, CT to C4
P. v. VI, p. 89
M. de Feria; Benedictus



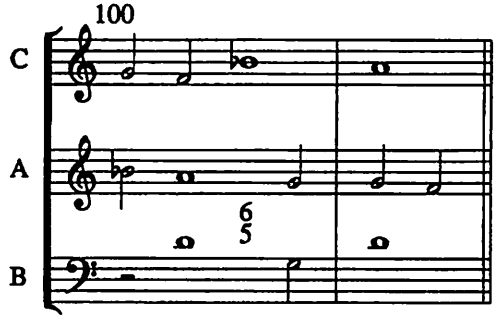
3b. var. (lowest voice enters after rest)
S, 5, ( ), CT to C4
P. v. VI, p. 1
M. Spem in alium; Kyrie



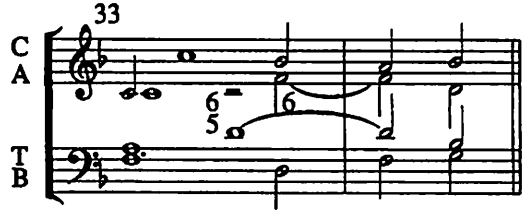
(continued)

Example 3. (cont.)

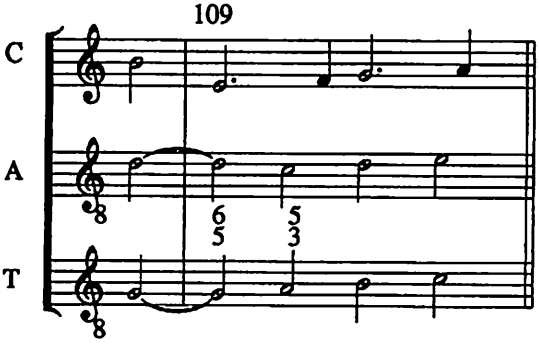
3c. S, 5, CT, DL
P. v. VI, p.16
M. Spem in alium; Credo (3-vc. exmple)



P. v. XXIX, p. 26
M Regina Coeli; Agnus (4-vc. example)



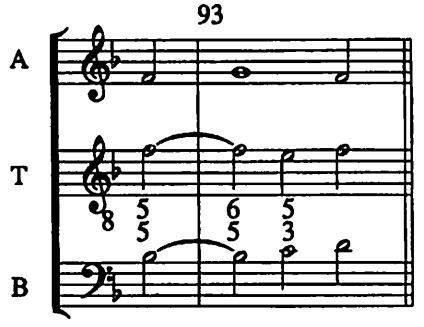
3d. S, 5, CT, AS (not to C4; not to avoid 5ths)
P. v. XXIII, p. 197
M. In Minoribus Duplicibus; Crucifixus



(continued)

Example 3. (cont.)

3e. S, 5, CT, AS (Asc. 5-6-5 to avoid parallel 5ths)
P. v. I, p. 46
M. O Regem Coeli; Crucifixus



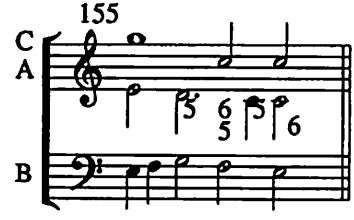
the 5th also occurs, but this subcategory provides for a change-of-bass effect under the resolving 5th, to either a 5/3 or 6/3 position. In subcategory 3d the motion from the bass of the 6/5 is by ascending step to a 5/3 position; note that this use is approximately 5% of the total. Also with 5% of the total, the use in subcategory 3e has a similar ascending-step bass resolution. Now, however, the moving upper voice creates an (ascending) 5-6-5 pattern with the bass, thereby avoiding parallel fifths; I assigned this procedure a separate subcategory in order to highlight this 5-6-5 device. Its last place in category 3 suggests a similarity to subcategories 4a, b, and c, which share the 5-6-5 feature to avoid parallel 5ths. However, category 4 examples have a different preparation of the 6th: the 6 of the 5-6-5 pattern is created by a *descending* step in the bass.

The fourth category, constituting approximately 4% of the total, contains those instances where the 6th and not the 5th is prepared (see Ex. 4). While four of the seven surveyed books have an example of this possibility, none of them refers to the voice leading from which the 6/5 emerges. Subcategories 4a, b, and c all contain the descending 5-6-5 two-voice combination whose purpose is to avoid direct parallel fifths. At the point of the sustained 6th, the third voice moves to the 5th to create the 6/5; then the resolution of the 6th (down by step) doubles this third-voice fifth. Note that 23

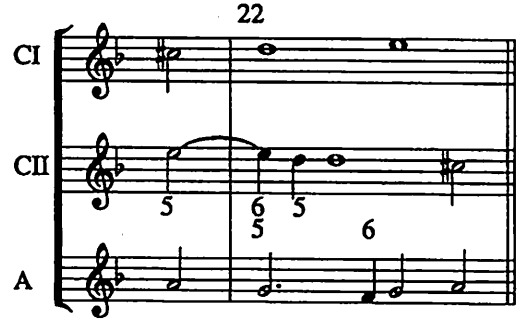
of the 28 examples in category 4 are in subcategories a, b, or c, and that the aural effect is rather different from the more usual prepared-5th setting. Examples for 4a (the most common, with 3%) show two different third-voice approaches to the 5th; Examples 4b and 4c show the ascending leap and common-tone departure from the bass. However, it is not impossible to have a prepared 6th without the maneuver that avoids parallel fifths; these constitute subcategories 4d, e, and f. The first example for 4d is in three voices, from the Gauldin text, where no source was identified. The three examples of 4d in the surveyed masses are all in four voices, as in the second illustration for 4d. Example 4e also is in four voices, but 4f is in three. In employing information from the categories in a counterpoint course, a teacher should share with students the 5-6-5 voice-leading implication of 4a, b, and c (as well as 3e) as a part of the

Example 4. Category 4: The 6th is prepared and resolved

4a. S, 6, DS, DS (Desc. 5-6-5 to avoid parallel fifths)
P. v. I, p. 16
M. Ecce sacerdos magnus; Crucifixus



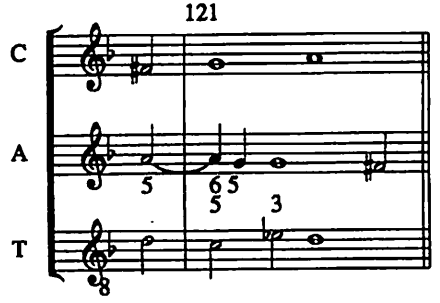
P. v. X, p. 31
M. Primi Toni; Benedictus



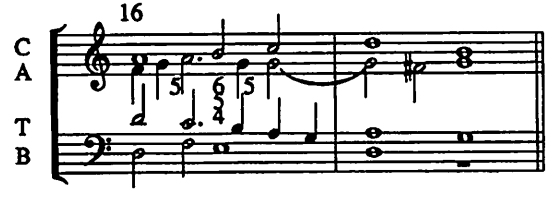
(continued)

Example 4. (cont.)

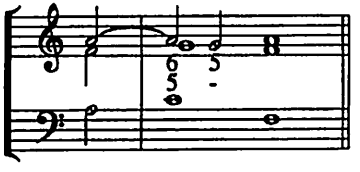
4b. S, 6, DS, AL (Desc. 5-6-5 to avoid parallel fifths)
P. v. XV, p. 32
M. Jam Christus astra ascenderat; Crucifixus



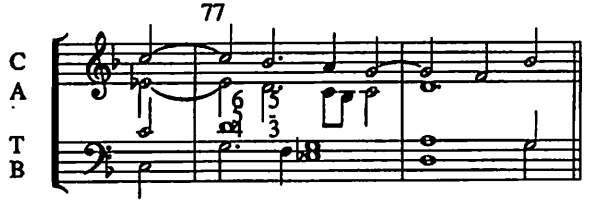
4c. S, 6, DS, CT (Desc. 5-6-5 to avoid parallel fifths)
Soderland (1947), p. 98
P. Motet; Dies Sanctificatus



4d. S, 6, AL, CT
Gauldin (1985), p. 93
Ex. 9-9f (No source)



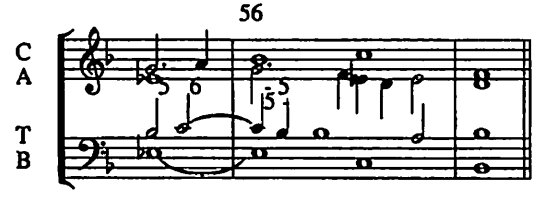
P. v. 1, p. 38
M. O regem coeli; Kyrie



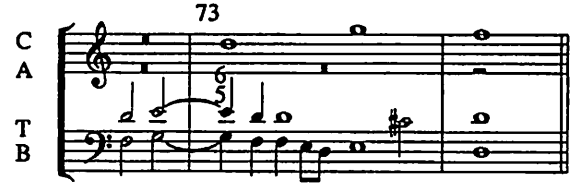
(continued)

Example 4. (cont.)

4e. S, 6, CT, CT (Neighbor 5-6-5)
P. v. XXIII, p. 65
M. Emendemus; Gloria



4f. S, 6, CT, DS
P. v. XXIII, p. 156
M. In Majoribus Duplicibus; Gloria



process of expanding analytical vocabulary, especially since the 5-6-5 pattern is not pointed out in the textual sources.

Occasionally a 6/5 combination will appear in a rhythmic position other than on strong beats one and three. Such occurrences constitute category 5 (see Ex. 5). Subcategory 5a is for the 6/5 in a half-note value on beats two or four; the examples show one three-voice illustration from the Merriman text and two in more than three voices from the Soderlund text. The three examples in the study are in four-voice texture. Subcategory 5b, with the 6/5 occurring only as a quarter-note value, is illustrated by two excerpts from the masses. The first is an off-beat placement; the second is on the weak half-note beat but in the relatively accented position. The 6/5 combinations in category 5 are by-products of individual lines moving above a bass and do not create the same aural impression as the strong-beat placements of categories 1 through 3. While I noted twelve occurrences in the survey, I did not investigate every weak-beat and quarter- note combination. Thus 3 and 9 appear in parentheses in Figures 1 and 2, as they represent a minimum number of

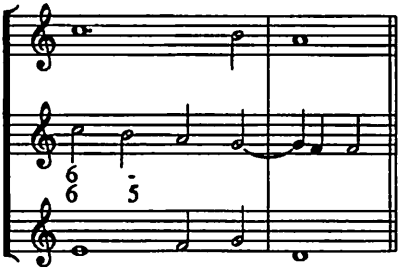
occurrences. (These are the twelve that are not included in the total of 583 for the other five categories.)

A sixth category completes remaining possibilities. In 6a (3% of the total) the 5th of the 6/5 is diminished (see Ex. 6a). Modal counterpoint does not often provide the opportunity to incorporate what would be regarded in functional tonal music as a dominant seventh in 6/5 position on the strong bass-note leading tone, thus pointing up a significant difference between the two styles. That some 6/5's occur with a diminished fifth instead of the usual (prepared) perfect fifth suggests, however, that the fifth of the 6/5 is the note that needs the careful handling afforded a dissonance.

Subcategory 6b acknowledges that 6/5's are not proscribed from passages in triple meter (see Ex. 6b). However, there is nothing different about the linear treatment for the 6/5's in category 6; thus the double asterisk footnote in Figure 1 gives the breakdown of the examples in 6a and b according to the voice-leading conditions in categories 1, 2, and 3. Finally, for the sake of completeness, subcategory 6c is provided (even though not needed for this study),

Example 5. Category 5: 6/5 placement on other than strong beat.

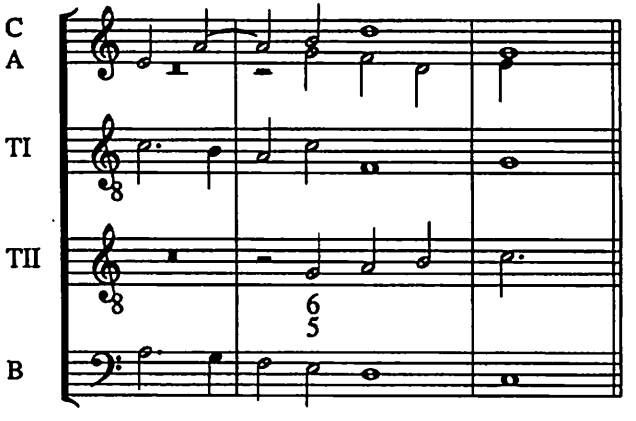
5a. W, ( ), ( ), ( ), 1/2 note
Merriman (1982), p. 74
Ex. 12-4 (No source)



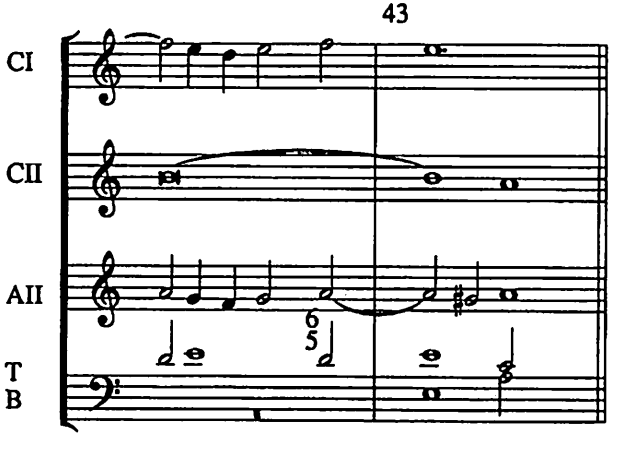
(continued)

Example 5. (cont.)

Soderlund (1947), p. 101
P. Litaniae de Beata Virgine



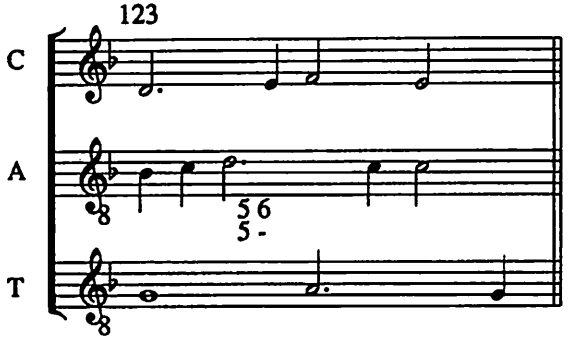
Soderlund (1947), p. 99
P. M. Ut Re Mi; Agnus Dei



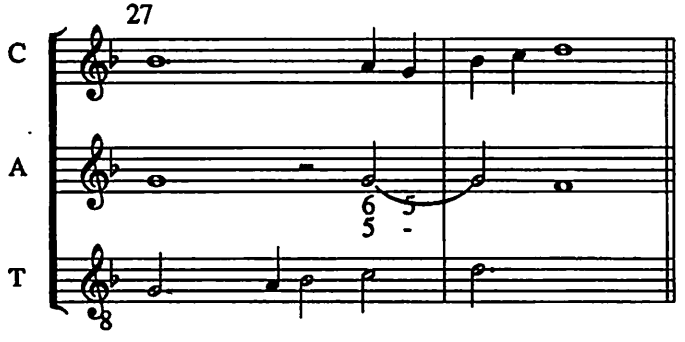
(continued)

Example 5. (cont.)

5b. W, ( ), ( ), ( ), 1/4 note
P. v. IV, p. 39
M. Inviolata; Crucifixus



P. v. XXIII, p. 206
M. In Minoribus Duplicibus; Benedictus

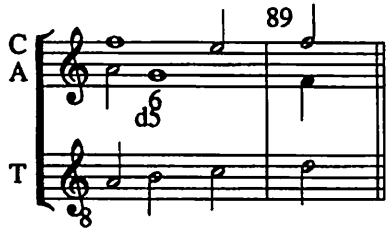


since in the analysis of other examples from different sources, especially in textures of four and more voices, an occasional instance may not fit within the delimitations of any other category. An example of category 6c is included in the Soderlund text (see Fig. 3).

Figure 2 lists the number of appearances of 6/5's for each subcategory by textures of sections of the masses: strictly three-voice sections, three-voice textures from four-voice mass movements, the sum of these two, then the 6/5's in four voices, and the sum of three- and four-voice appearances, followed by the approximate percentage this number is of the total of 583 when this number is five or more (see Fig. 2).

Example 6. Category 6: Less ususal occurrences

6a. 5 of 6/5 is a diminished fifth
P. v. XXVII, p. 212
M. Pater noster; Crucifixus



6b. 6/5 occurs in triple meter
P. v. IV, p. 19
M. De Beata Virgine; Sanctus

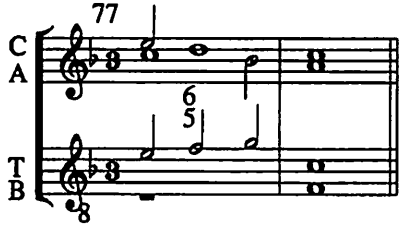


Figure 3 lists the seven textual sources by column. In each column are page reference numbers, by respective category, for the 6/5 uses illustrated in notation in each book. Abbreviations employed include: Cl = Clemens non Papa; DeM = DeMonte; ns = no source identified (it is assumed that the example is by the author); P = Palestrina; Vic = Victoria; + = more than one example. Examples are in three voices unless indicated otherwise (see Fig. 3).

Figure 2 should help to relate the information from this survey to the kind and amount of coverage of the 6/5 that one would choose to include in a counterpoint course and, as it does in relation to Figure 3, help to provide a source for comparing material in texts to the uses in the surveyed masses. The information in this article is meant to show that the employment of contextual references from a wide selection of Palestrina's music contributes a broader dimension to what otherwise could be a less-than-complete view of the 6/5 in a study of sixteenth-century contrapuntal style.

Figure 2. Occurrences of 6/5 in Palestrina 3-voice sections and 4-voice masses

		Beat	Vc. prepared	Appr. to Bass	Depart. from Bass		2894 bars 73 3-vc. secs.	18166 bars 3-vc. tex. from 40 4-vc. masses	3-vc. Total	18166 bars 4-vc. tex. from 40 4-vc. masses	21060 bars Total	Approx. %
1.	a	S	5	AS	AS		22	+ 130	= 152	+ 55	= 207	36
	b	S	5	AL	AS		2	19	21	7	28	5
	c	S	5	DL	AS		11	50	61	22	83	14
	var.			PT			7	18	25	10	35	6
2.	a	S	5	( )	AS to °5/3		4	32	36	5	41	7
	var.				AL to °6/3		0	0	0	2	2	
	b	S	5	( )	AS to 6 or 5-6		1	8	9	2	11	2
	c	S	5	( )	AS in Aug.		2	1	3	2	5	1
	d	S	5	( )	DL to 6		0	1	1	1	2	
	e	S	5	( )	DS to 6		0	0	0	1	1	
	f	S	5	( )	AL		0	0	0	0	0	
3.	a	S	5	AS	CT to C4		0	4	4	12	16	3
	var.			DL	CT to C4		0	1	1	0	1	
	b	S	5	CT	CT to C4		6	9	15	8	23	4
	var.			( )	CT to C4		0	1	1	2	3	
	c	S	5	CT	DL		1	4	5	1	6	1
	d	S	5	CT	AS		1	15	16	16	32	5
	e	S	5	CT	AS Asc 5-6-5		7	12	19	12	31	5
To avoid 5ths 4.	a	S	6	DS	DS Des 5-6-5		2	4	6	11	17	3
	b	S	6	DS	AL Des 5-6-5		1	0	1	4	5	1
	c	S	6	DS	CT Des 5-6-5		0	0	0	1	1	
	d	S	6	AL	CT		0	0	0	3	3	
	e	S	6	CT	CT N 5-6-5		0	0	0	1	1	
	f	S	6	CT	DS		0	1	1	0	1	
5.	a	W			1/2		0	0	0	(3)	(3)	
	b	W			1/4		(2)	(1)	(3)	(6)	(9)	
6.	a				6/°5		2	2	4	11	15	3
	b				Triple		0	6	6	7	13	2
	c				Free		0	0	0	0	0	
							69 (2)	+ 318 (1)	= 387 (3) +	196 (9)	= 583 (12)	98

Figure 3. Notated examples of 6/5 in surveyed texts

		Bassett	Benjamin	Gauldin	Jeppesen The Style	Merriman	C. Smith	Soderlund
1.	a	p42 P	p95 ns	p93 ns		p73 ns	p79 ns	p95 ns
	b							
	c							
	var.		p95 ns		p208 C1 5v			
2.	a	p42 P		p93 ns			p79 ns	p96 P
	var.							
	b	.		P93 ns			p79 ns	p95-6 ns
	c							p95 ns
	d			p93 ns			p79 ns	p96 ns
	e			p93 ns				
	f							p96 P 4v
3.	a		p96 ns	p94 ns				
	var.						p80 Vic	
	b	p43 P				p 76 ns		p97 P
	var.							
	c							p96 P
	d							
	e				p205 P 4v			
4.	a						p81 P	p99 P+3,4v
	b							
	c					p 74 ns		p98-9 P+4-6v
	d			p93 ns				
	e							
	f							
5.	a				p232 P 4v 241-4 P + 4v	p 74 ns		p99 P 4v
	b				242-3 ++ 4v	p74 ns		p102 P 4,5v
6.	a			p93 ns		p74 ns	p79 ns	p97 DeM
	b				113-4P 5v			p104-5 P 4-6v
	c							p100-1 P+3-5v

A SPECIES-COUNTERPOINT METHOD LEADING TO TONAL FOUR-PART WRITING

Ken Stephenson

Foundations

Today's undergraduate music theory programs are suffering the results of the contradiction of two trends that, despite their conflicting aims, appear relentless. First, with ever growing demands from accreditation agencies, state education boards, and general-education committees, many programs are no longer able (assuming they find it desirable) to require four or even three years of theory. In many schools, topics traditionally treated in the junior and senior years such as form must, if covered at all, be included in a freshman/sophomore sequence. At the same time, however, ideas about what "theory" entails are increasing. While still reluctant to let students finish a core undergraduate theory sequence without a solid foundation in forms and harmony, many teachers feel that they must also include counterpoint and twentieth-century techniques as well as, perhaps, reductive analysis, orchestration, or Renaissance techniques. As a result of these two opposing trends, instructors are frustrated; they feel that they must cover more material than their own teachers did in less time, and that as a result the students' depth of understanding is less.

Incorporation of several topics into the core sequence can in some cases work to the benefit of the program, however. For instance, while many institutions center the instruction in the freshman-level class around four-part harmony (often after a review of fundamentals) and reserve the topic of counterpoint for an upper-level (and thus probably elective) course, some find that the benefits of giving beginning students instruction in counterpoint before proceeding

to harmony justify the resulting abbreviation of time spent on harmony. The counterpoint-first curriculum can, in addition to enlightening students on a topic interesting in its own right, offer students (1) a better understanding of the rich interplay of musical forces present in even the simplest piece, (2) an historical context for many of the stylistic features of harmonic writing, and (3) an introduction to some concepts (suspensions, for instance) easier to grasp in two parts than in four.

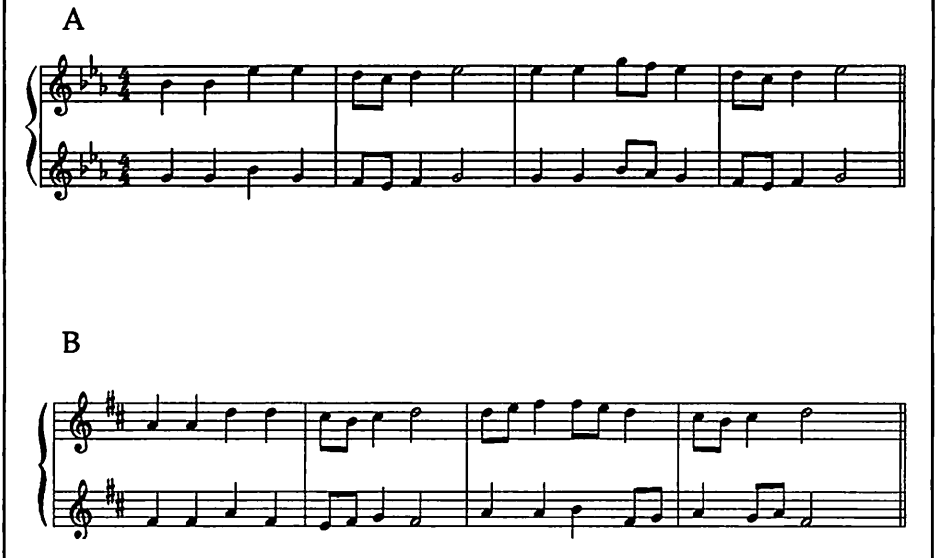
At the University of Oklahoma, where I am currently coordinator for the freshman/sophomore theory classes, most of the majors are required to take five semesters of a core music theory sequence. For various reasons, we devote the entire third semester to the study of forms, and the entire fifth semester to twentieth-century techniques. In order to deal with minor deficiencies and to ensure agreement on terminology, the first semester begins with five weeks of fundamentals. This leaves two and two-thirds semesters in which to teach the basic tonal, harmonic, and melodic procedures needed to make some sense out of a Chopin mazurka or a Schubert song. Many programs take four full semesters to cover basic harmony, so the task may at first glance seem rather difficult. But in planning the content of these two-plus semesters, I decided to follow the road less taken and begin the college-level material with several weeks of work in counterpoint, leaving only two semesters for the study of harmony. For this purpose, I have developed my own method of counterpoint instruction, an amalgamation of several historical methods including species-counterpoint and figured-bass methods. It is called the Extended Species (or ES) method because it extends the traditional number of species in order to reach the goal of composition of simple tonal passages in four voices. Besides ending with a seventh species, its two most unusual features are (1) the inclusion of topics related to both certain modal and certain tonal styles, and (2) the incorporation of seventeenth-century ideas concerning the ways in which rules of consonance depend upon the identity of the bass note, ideas largely forgotten after the shift in the eighteenth century from predominantly contrapuntal thinking to predominantly harmonic thinking. It is primarily because of these unusual features that I present the method here.

I have found that the benefits of beginning the undergraduate sequence with the ES method far outweigh the drawbacks of cutting out time with harmony. The main benefits are four in number. The first would apply to the inclusion of counterpoint at any point in a theory curriculum: by studying counterpoint, the student may develop an appreciation for melodic shape and for independence of line, concepts which, while important to the study of four-part harmony, are not so easily acquired in that approach. I introduce the first lecture on counterpoint with a comparison of two versions of a pop song called "Devoted to You," one by the Everly Brothers in which parallel sixths and thirds prevail, and one by Carly Simon and James Taylor in which contrary motion and rhythmic independence prevail (see Ex. 1.) When asked to vote for the more interesting version, students overwhelmingly choose the latter. When asked to state why, several students usually respond with comments about the independence of line, so it is clear that their judgment is not merely the result of their preference for the currently more popular singers.[1]

My second reason for including counterpoint early in the freshman syllabus is that it helps me reach one of my objectives for the first four semesters of the theory sequence: to teach students that a piece of music weaves its way through a multiplicity of structures—vertical and horizontal; local, global, and cyclical—that work together to inform the significance of individual events. In other words, a given note works not only because it relates to a particular harmony that in turn fits an appropriate harmonic succession, but also because the note forms part of a figure or theme that in turn fills a particular role in the large-scale form of the piece, because it fits an appropriate scale and fulfills the melodic and harmonic functions appropriate to its position in that scale, because it plays a part in the treatment of dissonance, because it comes at an appropriate metrical position, and so on. Conveying this principle, which I teach through an in-depth study of common-practice music but which

[1]Oddly enough, the students generally seem to accept at this point the assumption that the interesting version is the better version. Teenagers in our society do not normally seem to make value judgments concerning music based on intellectual interest.

Example 1. Comparison of two versions of "Devoted To You": (A) Everly Brothers, (B) Carly Simon and James Taylor (Transcription by K. Stephenson)



applies to music of many styles, necessitates the study of both counterpoint and harmony (in addition to form, melodic analysis, and reductive techniques).

My third reason is that preceding the study of four-voice harmony with an introduction to counterpoint provides the student with an historical context for many theoretical concepts by tracing a portion of the development of compositional styles. My method of counterpoint introduces the students to the difference between mode and key, the difference between harmony based on a succession of intervals and harmony based on a succession of chords, the origin of figured-bass symbols, the historical reason for avoiding diminished triads in root position, the origin of the authentic cadence, the reason some chords are more common than others, period structure, the history of species-counterpoint study, and other ideas.

My fourth reason for teaching two-voice counterpoint before four-voice harmony is much more practical than the first three: in studying counterpoint, students learn to deal with dissonant embellishments and to avoid problems such as parallels and awkward leaps in a context of just two voices as opposed to the four voices more common to freshman theory work. With two voices, only one harmonic interval exists; if it is a fifth, the student knows not to follow it with another. Four voices, however, present six different harmonic intervals simultaneously, six places in which a fifth might be lurking.

The first, second, and fourth species

The ES method begins with modal exercises for two reasons. The first is that modal counterpoint is in one way simpler than tonal counterpoint: during the internal portions of a phrase scale-degree functions need not be taken into account. As Carl Dahlhaus explains:

> In major-minor tonality, the "material" identity of the a-minor chord in D- and E-minor contexts is secondary, if not insignificant, in relation to the "functional" difference between the roles of dominant and subdominant. But in a modal context, it is questionable and indeed improbable that the "a"-degree also has a dramatic reversal of character when it is related to e instead of d.[2]

> The modal clausula, in contrast to the tonal cadence, is not the result of a harmonic progression. To be sure, the mode can be detected from the clausula, but the clausula forms neither the center around which the sonorities group themselves nor the goal toward which they strive. The clausula is used much like a "sign" of the mode, without the mode being the principle that governs the disposition of the other sonorities.[3]

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[2]Carl Dahlhaus, *Studies on the Origin of Harmonic Tonality*, trans. Robert O. Gjerdingen (Princeton: Princeton University Press, 1990), 198.

[3]Ibid., 243.

Thus, by beginning with modal exercises, the students may start writing by concentrating simply on the interplay of interval and melodic shape, with degree functions coming into play only at the beginning and end of a phrase.

The second reason for beginning with modal exercises is that doing so contributes to the students' sense of the history of styles, putting both modal and tonal practices in an historical context. For instance, when the quantity and importance of scale degree functions increase later in the method, this increase is seen as part of a group of stylistic features commonly associated with tonal music, a means whereby a passage of tonal music can lead toward a conclusion in a way largely unavailable to modal music. When other features associated with tonal music are introduced later in the method, they become part of the development of musical style. Students then understand that their theory class is designed to show them how music of selected historical styles was constructed; they rarely suffer from the otherwise somewhat common misconception that theory class teaches them how all music ought to go.

The ES method is loosely based on the traditional species method. It begins with a first species in which students write one-to-one counterpoint using only consonances. The rules for the first species are listed in full in the appendix.[4] Integrity of melody is controlled by a rule requiring more steps than leaps, a rule defining acceptable melodic intervals, and a rule, suggested by passages in

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[4]As with all lists of rules, the list for each species in the ES method is designed to strike a balance between practicality and faithfulness to historical compositional practice. Because the whole method, from first species (two-part modal counterpoint) to seventh species (four-part tonal counterpoint), is designed to last just ten weeks, faithfulness yields more often than not to practicality. The rules, for instance, neither limit the frequency of large leaps relative to the frequency of small leaps nor discriminate on the basis of melodic direction by prohibiting descending sixths; in these particular cases, the necessary additions would make the rules more cumbersome only for the sake of limiting what students rarely do anyway. The method is designed not to give the students a thorough introduction to modal practice, but rather by introducing them to modal music to make clearer than would otherwise be possible several musical concepts, including certain stylistic features peculiar to common-practice music.

Salzer's *Structural Hearing*,[5] requiring that the melody follow a clear overall plan of motion. Two rules control the independence of lines, one requiring mostly contrary motion and another limiting simultaneous leaps. This introduction is sufficient to make the point to students that even the simplest music involves a combination of vertical and horizontal forces. Later species, while introducing important concepts, gradually accrue more rules designed to refine the three-way balance of melody, harmony, and independence of line.

Second-species exercises involve writing two notes against every note of the cantus firmus and introduce students to the most common usages of dissonance: weak-beat passing tones and neighbor tones. The rules for the second species can be found in the appendix; rules which remain the same as those for first species are not repeated.

The third species of most traditional methods usually attempts to bring students closer to being able to write florid counterpoint but often introduces few new concepts of dissonance or melodic practice. Since the goal of the ES method is not compositional ability but the recognition of the interaction of musical forces, this method omits the third species. In addition, the method outlined here is designed to last only nine or ten weeks. Had we more time in our curriculum for the required theory core, I would by all means restore the third species to its rightful place.

The ES system thus proceeds next to the usual topic of the fourth species, namely, the suspension. Many students, even some of those who do well in the first two species, inevitably have a great deal of trouble with suspensions.[6] Consequently, only two rules not deal-

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[5]See Felix Salzer, *Structural Hearing* (New York: Charles Boni, 1952; corrected reprint ed., New York: Dover, 1982), 60. For instance: "A melody that has no design other than to begin on the tonic and to arrive somehow on the final tonic would achieve little more than an aimless circling of tones or an arbitrary succession of undirected lines whose only object is to fill up space."

[6]My comparison of a suspension with Wile E. Coyote running off a cliff and then falling only after he notices the dissonance of two miles of empty space looming beneath him seems to help.

ing directly with the suspension are introduced. The appendix lists the new rules for the fourth species.

The fourth species of the ES system does not insist on a syncopation in every measure. In this way it allows passing tones and neighbor tones to coexist with suspensions in the same exercise and thus fulfills one of the traditional functions of the fifth species: the free mixture of the dissonances of the second, third, and fourth species. The fifth species also traditionally allows a mixture of the rhythms of the first four species; since the shorter rhythmic values of the third species are excluded from the system, however, this role too is played sufficiently well by the fourth species. Again, with more time, the full mixture of rhythms could be explored in a restored fifth species. Given the goals of the system and the time allotted to it, however, the current solution of omitting the third and fifth species while loosening rhythmic restrictions in the fourth proves satisfactory.

The sixth species: introduction to tonality

With the next step, the ES method begins to deviate from other species-counterpoint methods in several ways. First, it marks a break with the traditional numbering system since it is called "sixth-species counterpoint." Most of the students who have learned this method over the last six years enjoy the quirkiness of the numbering system (any method that helps make students enjoy theory class can boast of at least that one strength). More importantly, because they know traditional methods usually divide counterpoint study into only five species, they sense that by learning the sixth species they are doing something innovative.

The second way in which the sixth species represents a break with tradition is more substantial and more germane to the unique purpose of the ES method. Whereas various species are traditionally distinguished primarily by rhythmic considerations, the sixth species in the ES method is distinguished from the earlier steps primarily by matters of pitch: it is here that students begin to deal with issues that distinguish tonal music from modal music. While the unusual rules introduced in this step are not traditionally incorporated into species-counterpoint methods, they are not innovations

within the broader context of music theory pedagogy as a whole. Some reflect accepted tonal practice while others represent largely forgotten notions found in many early figured-bass treatises.

With the sixth species, the students begin to work with tonal music as opposed to modal music, learning several features associated with simple tonal styles. The exercises use either a major or a minor scale, abandoning the modal scales of the earlier species, and the differing functions of particular scale degrees are given consideration. The given melody is always a bass line and outlines two phrases, one ending with a half cadence and one with an authentic cadence; each of the two phrases has a standard length of four measures, whereas earlier exercises extended from seven to fifteen measures. These bass lines are usually similar to bass lines found in passamezzi and chaconnes.

Teaching the importance of scale-degree function and of a cadence's degree of tonal closure, concepts more associated with certain tonal styles than with modal, is one of the primary goals of the method. Why then all the time spent with modal music? The introduction of these features is delayed until this point partly to make the first exercises easier by keeping them free of such considerations and partly to give the students an historical context for the ideas. But the delay also makes students more aware of their importance than would otherwise be true. The students learn that the title of J. J. Fux's *Gradus ad Parnassum* suggests that the progression from one species to another can be compared to the taking of steps toward a goal, the goal in the case of this method being music that sounds familiar to them. Most students agree that correct first-species exercises are better than incorrect exercises, but still often do not consider the result to be much like real music. The first sixth-species exercise done in class, however, usually elicits applause from the students; their delight at having constructed a passage in a familiar style encourages them that they have indeed been climbing, that their work has been directed toward a worthwhile goal. By introducing features such as regular phrase length, balance of cadences, and degree function only after a few weeks of work with modal music, the method sets these concepts in relief and stresses to the students their importance in the simple tonal styles familiar to them, while teaching them not to expect to find them as normal

components of modal polyphonic music.

The additional rules for the sixth species are found in the appendix; what might puzzle the reader most is the consonance chart. While most current pedagogical methods teach that a major or minor sixth is always consonant, the ES method indicates, for instance, that a sixth is acceptable as a consonance only in certain situations, namely, when the bass note is RE, ME/MI, FA, LE/LA, or TE/TI. (The chart assumes a solfège system in which tonic is always called "DO," in major or minor mode.) The concept of contextual consonance is not a new idea; it can be found in seventeenth-century figured-bass treatises such as those by Charles Masson, Galeazzo Sabbatini, and Lorenzo Penna.[7] The consonance chart differs in a few details from each of these writers; the main criterion used in the construction of the chart, after faithfulness to simple, early tonal practice, was that it have a somewhat easily memorizable pattern to it. The chart may be summarized thus:

(1) All seconds, fourths, sevenths, and augmented or diminished intervals are always dissonant.
(2) Above a bass note of DO or SOL, a sixth must be treated as a dissonance.
(3) Above MI or TI, a fifth must be treated as a dissonance, and an octave is not allowed at all. (An octave cannot be used as a dissonance because it cannot resolve by step to a consonance.)
(4) Above RE in minor, a fifth must be treated as a dissonance (note the ! on the chart, signifying the omission of the fifth as a consonance).

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[7]Charles Masson, *Nouveau traité de règles de la composition de la musique* (Paris: the author and Jacques Collombat, 1697; facsimile of 1705 ed., Geneva: Minkoff Reprint, 1971); Galeazzo Sabbatini, *Regola facile e breve per sonare sopra il Basso continuo* (Venice: Salvatori, 1628); Lorenzo Penna, *Primi albori musicali* (Bologna: Giacomo Monti, 1679; facsimile ed., Bologna: Forni, 1969). I wish to thank Drs. Richard Hervig and Donald Jenni, both at the University of Iowa during my work there from 1984 to 1989, who pointed me toward the concept of contextual dissonance at various times. I apologize to them for any misrepresentation of their instruction, and I take full responsibility for any problems with this system.

These rules result in the avoidance of (1) the outlining of such rarities as the vi_6 and iii_6 in major, and the VI_6, III_6, and (minor) ii in minor, (2) the outlining of the vii° in root position (and in the minor mode, the ii° in root position), and (3) the doubling of the leading tone. Other results, less crucial but acceptable for the sake of a degree of simplicity in the chart, are the avoidance of the mediant triad and of the doubling of the third in the first-inversion tonic triad.

An example of such limitations on the use of consonances can be seen in the famous minuet from the *Notebook for Anna Magdalena Bach*, shown in Example 2.[8] For example, above SOL, only thirds, fifths, and octaves are treated as consonances. Sixths above SOL are treated as appoggiaturas (m. 8), neighbor tones (m. 15), or passing tones (mm. 21 and 29). An exception to the chart occurs in m. 18, where an octave above TI is used as a consonance. Other examples especially suitable for demonstration to a beginning class can be found in two-part psalm tunes from Playford's *Introduction to the Skill of Musick*.[9]

All other ways in which the rules for the sixth species supersede the rules for the fourth species are meant to reflect commonly accepted tonal theory. Rules 17 and 18, for instance, introduce the students to the notion of unstable scale degrees and their functions, while rule 10 is an attempt to guide the students toward the proper use of the variable scale degrees in minor. While imperfect, these rules reflect normal practice more accurately than the more common renderings: "FA normally resolves down, and TI normally resolves up; the sixth and seventh scale degrees are normally raised when leading up and lowered when leading down."[10]

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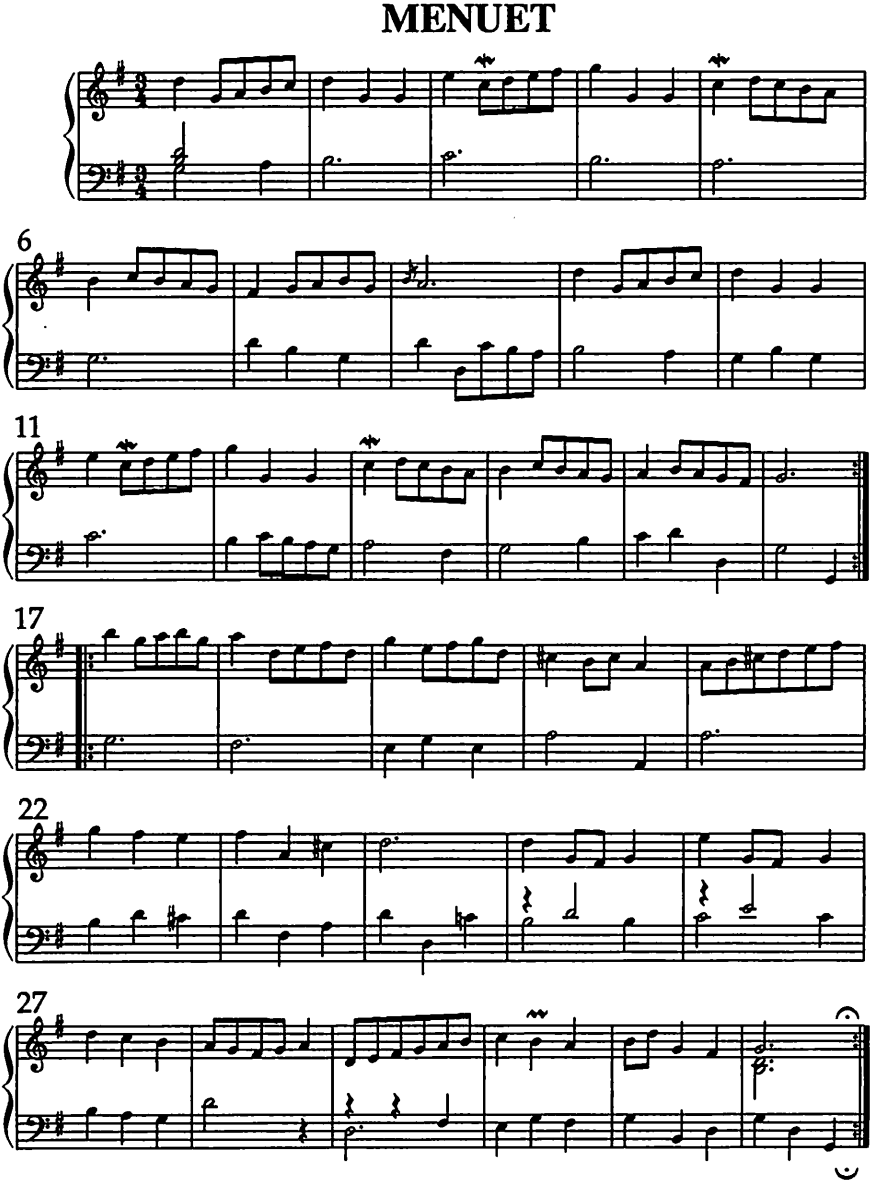
[8]Ernst-Günter Heinemann, ed., *Notenbüchlein für Anna Magdalena Bach* (Munich: Henle, 1983), 3.

[9]John Playford, *An Introduction to the Skill of Musick*, 7th ed. (London: W. Godbid, 1674; facsimile ed., Ridgewood, NJ: Gregg Press, 1966), 73-89.

[10]Dissatisfaction with these simplistic guidelines is shown also in, for instance, the discussion of the melodic minor scale in Ralph Turek, *The Elements of Music: Concepts and Applications* (New York: Alfred A. Knopf, 1988), vol. 1, 52.

Example 2. Minuet from *Notebook for Anna Magdalena Bach*



Rule 13 indicates that all metrically strong dissonances are to be resolved by descending motion. (For purposes of analysis, the students learn that "metrically strong" must be taken in a relative sense: it refers only to strong beats when a given passage's rhythmic values are equal to a beat, to any beat when the beat is divided at the first level, etc.) The rule is clearly a generalization, a simplification of actual practice. In fact, some exceptions occur in the minuet in Example 2. But in general the metrically strong dissonances written between 1670 and 1800 resolve down, and most upwardly resolving, metrically strong dissonances written by students today do not work well. Students learn at a later date about the retardation and about the growing predilection starting in the late eighteenth century for upwardly resolving appoggiaturas. Another reason for insisting on descending resolution at this point is that doing so prepares the student to understand the proper resolution of the cadential six-four (normally on a strong beat, sixth and fourth above SOL treated as dissonances).

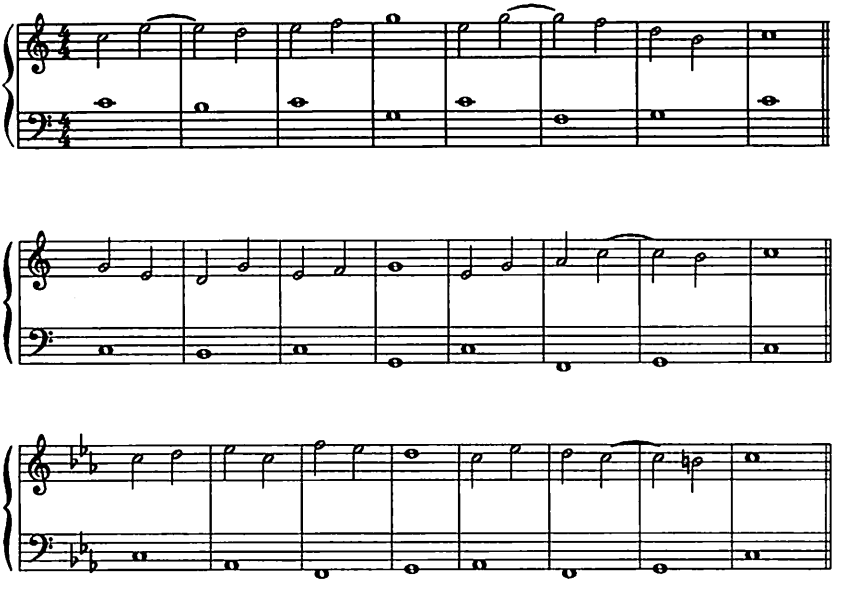
To the reader, these rules may seem a little unwieldy. They are approached incrementally, however, and, when treated by the teacher with healthy doses of humor, the students generally accept the approach quite willingly. By the eleventh week of class, students with no previous formal theory background are writing short exercises that sound to them (and to the instructors) almost like music. Actual student exercises are provided in Example 3. (The first example was written before the ES method dictated the inclusion of a strong-beat dissonance in the penultimate measure.)

Four-part counterpoint: the seventh species

With the seventh species, the method enters the realm of four-part harmony. At this stage the student writes one note in each of three different voices above each given bass note. The rules for the seventh species are in the appendix.

The consonance chart for the seventh species is the same as that for the sixth species. When used as outlined in rule 2a, the chart allows only the most common harmonies. As mentioned above, less common harmonies such as the first-inversion submediant are avoided. The mediant chord is not allowed at all, although it can

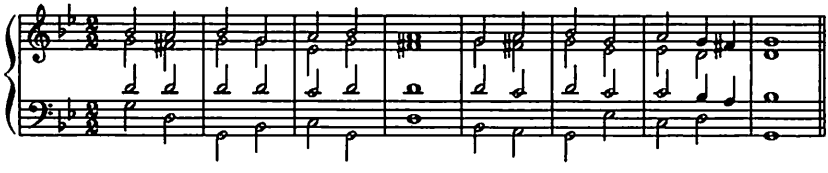
Example 3. Student sixth-species exercises; bass lines were given, not student composed, and were modeled after simple bass lines of pieces such as passamezzi and chaconnes



actually be found somewhat easily in real music. The main reason for its exclusion is to keep the third and seventh scale degrees exactly alike on the chart for the sake of ease of memorization, although the mediant is the rarest of the seven harmonies and thus may be excluded at this point with no appreciable negative results. All second-inversion chords are treated as dissonant, embellishing chords. The correct use of the consonance chart together with rule 2a also results in the avoidance of doubling the leading tone, the avoidance of doubling the bass in a first-inversion tonic triad, and the assurance of doubling the bass in a first-inversion supertonic triad, principles found in many undergraduate harmony books usually stated in different words—as, for instance, a preference for doubling the "tonal" scale degrees $\hat{1}$, $\hat{4}$, and $\hat{5}$.

Some of the rules present from the beginning of the method have been changed for the seventh species in order to produce the narrower lines typical of harmonic writing: rule 7 encourages rather than forbids repeated notes, rule 14 indicates that lines should normally have a rather narrow range, and rule 9 (governing shape and climax) has been lifted. Otherwise, the rules are essentially the same as those for the sixth species and are modified only to clarify their application to four voices rather than to two. The student is now writing a full chord above each given bass note instead of a single selected allowable interval. A typical student exercise is found in Example 4.

Example 4. Student seventh-species exercise



It should be noted that instruction on common-practice harmonic progression is reserved for the second semester of the sequence and is not incorporated into the ES method at this time. The bass lines for seventh-species exercises must be constructed, however, in such a way that correct harmonic progressions result. One pitfall is that the line $\hat{1}$-$\hat{2}$-$\hat{3}$ may under the present rules be harmonized I-ii-I^6. This line should be given only in the minor mode, in which a root-position supertonic chord is not allowed.

Conclusion

I have used the ES method successfully for several years. I hope that my students learn several valuable lessons from these exercises. By trying to compose their own contrapuntal passages under

these guidelines they begin to appreciate the notion that a given note in any piece often has to meet several criteria. Normally it must at least (1) fit the current scale, (2) form a consonance or dissonance appropriate to the context, (3) contribute to an overall melodic shape, and (4) fulfill its unique tendencies as a particular scale degree. They learn historical background that might inform their conception of such notions as dissonant harmonies and the traditional injunction against parallel fifths, and that might also help them in their study of general music history. They also learn ideas not necessarily as part of the system but that are explored along the way, such as the cadence structure of a period. I hope they grasp a few technical ideas such as the use of suspensions more quickly within a context of two voices than they might within the context of four-part harmonic texture. They certainly do not learn that "music theory" means Roman numeral analysis, a misunderstanding many students acquire after a year of even the most responsible instruction in four-part harmony.

I do not know if my students learn to write suspensions or to avoid parallel fifths any better with my method than with any other method, although I strongly suspect that it is true. All theory teachers know that lack of attentiveness and enthusiasm is a major problem in theory pedagogy; species-counterpoint methods attempt to make the subject more engaging, and this method in particular is very effective in this regard. Regular applause from a theory class is unusual enough to suggest a significant difference in their level of participation. For some students, of course, the method is too hard and leads to frustration. These students, on the other hand, would perhaps struggle as much or more with the more common harmony lessons.

Apart from the question of whether students learn certain ideas better, however, the ES method includes some unusual features that the students would assuredly not learn at all if I did not use the method—the historical development of the common practice, the nature of counterpoint and its relationship to harmony, the complexity of even seemingly simple music—and I see these benefits as my main justification for beginning students with my rather untraditional counterpoint method rather than with the four-part writing that is the basis of so many commonly used harmony texts.

APPENDIX

LISTS OF RULES

First species

1. For every note in the cantus firmus, add one note in the mode, consistently above or below the C.F. as instructed.
2. Harmonic intervals should all be consonances.
3. Melody should consist mostly of steps.
4. Contrary motion should be used most of the time.
5. If adding counterpoint above, start with P5 or P8.
   If adding counterpoint below, start with PU or P8.
6. The cantus firmus will step down to DO at the end.
   The added melody should step up to DO at the end.
7. No immediate repetition of pitches.
8. No two perfect harmonic intervals of the same size directly after one another.
9. Added melody should have a good shape; the climax (highest note, sometimes lowest) should appear only once and should be clearly led to or led from. The climaxes of the two melodies should come at different times.
10. Raise the seventh scale step in Dorian and Mixolydian modes (penultimate note only).
11. Acceptable melodic intervals: M/m2, M/m3, P4, P5, M/m6, P8. Not allowed: sevenths, anything larger than an octave, augmented and diminished intervals.
12. If both lines have leaps in the same direction at the same time, neither should be larger than a third.

Second species

1. For every note in the cantus firmus except the last, write two notes in the mode, consistently above or below the C.F. as instructed. (Write one note against last note of C.F.)
2. Harmonic intervals on strong beats should all be consonances.

Harmonic intervals on weak beats may be dissonant.

4. Contrary motion should be used most of the time. (Usually the second note of one measure and the first note of the next determine the direction of motion.)
8. No two perfect harmonic intervals of the same size directly after one another, or on successive downbeats. (Exception: one voice leaps an octave while other stays the same.)
13. Dissonant notes must be approached and left by step.
14. Maximum range of added melody is a tenth.

(Other rules as in first species.)

Fourth species

2. Consonances can occur on any beat. (Exception: a correct 7-6 or 2-3 suspension MUST occur in the penultimate measure.)
   Dissonances on strong beats must be correct suspensions.
   Dissonances on weak beats must be correct neighbor tones or passing tones. (See also rule 13.)
4. Contrary motion should be used most of the time. (Usually the second note of one measure and the first note of the next determine the direction of motion. Measures with suspensions are neutral.)
6. The cantus firmus will step down to DO at the end.
   The added melody should step up to DO at the end. Include a suspension in the penultimate measure.
7. No immediate repetitions (except in suspension figures).
8. No two perfect harmonic intervals of the same size directly after one another (exception: one voice leaps an octave while other stays the same), or on successive downbeats, or as the preparation and resolution of the same suspension.
13. Metrically weak dissonances should be approached and left by step. Metrically strong dissonances should be prepared by the same note, and resolved with a descending step.
15. Two successive leaps in same direction should not add up to a seventh or anything larger than an octave.
16. Most leaps larger than a third should be followed by a step in the opposite direction.

(Other rules as in second species.)

Sixth species

1. *Above* every note in the bass line except the last of each *phrase,* write two notes in the key. (Write one note above last note in each phrase.)
2. Consonances can occur on any beat.
   Each bass note must have at least one consonance above it; thus, the last interval of each phrase must be consonant.
   Dissonances can occur on any beat (in the 2:1 measures) if they are approached and resolved correctly. (See rule 13.)
   The accompanying chart defines the intervals that are to be treated as consonances for any given bass note.
5. Write all counterpoint *above* the given line.
   Start the counterpoint with a PU, M/m3, P5, or P8.
6. The bass line will *skip from SOL to DO* at the end.
   The added melody may step *either up or down* to DO at the end. The third note from the end should be a step higher than the penultimate note: the melody should end MI(ME)-RE-DO or DO-TI-DO. (DO-TI-DO is preferable.)
9. Added melody should have a good shape; the climax *of each phrase* (highest note, sometimes lowest) should appear only once and should be clearly led to or led from. The climaxes *of the two phrases should come on different pitches.* (TI is not allowed as a climax; see rule 18.)
10. In the *minor mode,* raise the seventh scale degree *if (1) the bass note is SOL, or (2) if the seventh scale degree is leading to DO.* (Assume it is leading to DO if DO is one of the next two notes. But your ear must be the final arbiter!) Raise the sixth scale degree if a raised seventh immediately before or after results in an augmented second. Do not raise the sixth or seventh degree if it results in an augmented octave with LE or TE in the bass.
11. Acceptable melodic intervals: M/m2, M/m3, P4, P5, M/m6, P8. Not allowed: sevenths, anything larger than an octave, augmented intervals. (Be careful moving to the leading tone! In general, approach the leading tone from above.) *Occasional diminished leaps are allowed.*
13. Metrically weak dissonances must be approached and left by step. Metrically strong dissonances must be resolved with

a descending step. *Metrically strong dissonances may be approached by step, from the same note, or by ascending leap.*

17. FA should not be used as a dissonant lower neighbor.
18. TI should not be the highest note of the added melody. If TI is used as the last note of the first phrase, the first note of the second phrase should be DO.

(Other rules as in fourth species.)

Sixth Species—Consonance Chart

MAJOR MODE

C	8	8		8	8	8	
O		6	6	6		6	6
N	5	5		5	5	5	
S	3	3	3	3	3	3	3
	DO	RE	MI	FA	SOL	LA	TI
D	2	2	2	2	2	2	2
I	4	4	4	4	4	4	4
S	7	7	7	7	7	7	7
S	d	d	d	d	d	d	d
	A	A	A	A	A	A	A
	6		5		6		5
Not allowed:			8				8

MINOR MODE

C	8	8		8	8	8	
O		6	6	6		6	6
N	5	!		5	5	5	
S	3	3	3	3	3	3	3
	DO	RE	ME	FA	SOL	LA/LE	TI/TE
D	2	2	2	2	2	2	2
I	4	4	4	4	4	4	4
S	7	7	7	7	7	7	7
S	d	d	d	d	d	d	d
	A	A	A	A	A	A	A
	6	5	5		6		5
Not allowed:			8				8

Seventh species

1. In general, write one note in each of three voices (tenor, alto, and soprano) above each given bass note. Exception: see rule 6.
2. You may occasionally write two notes in a given voice above one note in the bass if resulting dissonances are approached and resolved correctly. (See rule 13.)

2a. The sixth-species chart defines the intervals that are to be treated as consonances for any given bass note. Where three intervals are possible, use all three, one in each upper voice. Where four intervals are possible, write a third and an octave above the bass plus either a fifth OR a sixth (not both). Where two intervals are possible, use one of the intervals twice.

3. *Tenor, alto, and soprano* should have more steps than leaps.
4. Contrary motion *between soprano and bass* should be used more than similar motion. (Cases involving oblique motion or suspensions are neutral.) *The four voices should never all move in the same direction at the same time.*
5. The soprano may begin on a M/m3, P5, or P8.
6. The bass line will skip from SOL to DO at the end.
   The soprano must end on DO. Above the penultimate bass note (SOL), write either MI(ME) and RE or DO and TI. If MI-RE is used, DO-TI must be used in an inner voice above this same bass note. If DO-TI is used, MI-RE must be used in an inner voice at the same time. Each case results in a fourth and a sixth, both dissonances above SOL, resolving to the requisite fifth and third.
7. *Repeated notes are desirable in harmonic progressions.* When the chance arises to repeat a note, do so.
8. No successive P5's; no successive PU's; no successive P8's (exception: any situation where at least one of the notes repeats). This means two intervals immediately consecutive, on consecutive strong beats, or as the preparation and resolution of the same suspension. (Four notes produce six intervals. However, the succession is disallowed only if the intervals are found in the *same* pair of voices. Note: Parallel fourths are OK.)

9. *Don't worry about it.*
11. Acceptable melodic intervals: PU, M/m2, M/m3, P4, P5, M/m6, P8. Not allowed: sevenths, anything larger than an octave, augmented intervals. (Be careful moving to the leading tone! In general, approach the leading tone from above.) Occasional diminished leaps are allowed.
12. If two lines have leaps in the same direction at the same time, neither should be larger than a fourth.
14. Maximum range of each added melody is a tenth. (They should generally cover much less space than a tenth in seventh species.)

(Other rules as in sixth species.)

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Reviews

Tom Manoff, *The Music Kit*. 3rd ed. New York: W. W. Norton, 1994. Workbook, 258 pp; Rhythm Reader and Scorebook, 133 pp.

Reviewed by Rosemary Killam

We music theorists frequently leave the teaching of fundamentals to others; our graduate and undergraduate students often teach fundamentals, even as they take our theory courses. Our evaluations of fundamentals teaching and learning, however, can cause significant influences in the music world. The potential market for using music fundamentals texts is fairly large, as evidenced by data from the College Music Society, the Music Educators National Conference (MENC), and the 1990 U.S. Census. The 1990 census lists 138,120 women and men as "musicians and composers";[1] MENC lists 98,498 people in "Music Group Total";[2] and the College Music Society lists 31,792 college music teachers as of October 1994.[3] Of course, many people might be listed in two, if not all three, of the previous totals, so we can't sum the numbers for a preliminary figure. In addition, these numbers do not take into account the music students in the United States, so the potential market is easily in the millions of people.

Many "working" musicians do not know a great deal about music fundamentals, and would probably prefer to learn privately and at their own rate. (I base this statement on field interviews

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[1]Bureau of the Census, *Detailed Occupation and Other Characteristics From the EEO File for the United States*, Supplementary Report prepared by the Housing and Household Economic Statistics Division (Washington, DC: Bureau of the Census, 1990), 2, Table 1.

[2]Market Data Retrieval, *Education Database* (Shelton, CT: MDR, 1994), 2.

[3]Miss Julie Johnson, telephone interview by author, College Music Society, Missoula, MT, 30 May 1995.

with musicians working full time in the Branson, Missouri theaters.) Professional musicians who do have a firm grasp of music fundamentals are often teachers, either private or in some institutional setting. These teachers constitute a potential market as they hunt ways to help their students learn fundamentals. Finally, many musical amateurs seek means of learning music fundamentals in an at-home/self-paced environment.

Music theorists may still validate Bruce Campbell's 1982 statement: "Most theorists devote a great deal of their time to educating undergraduates, yet regard anything remotely pedagogical as somehow leprous."[4] However, the existence of the *Journal of Music Theory Pedagogy* may indicate that our attitudes are changing. Situated as we are at the close of the twentieth century, we have reasons to evaluate this century's music theory pedagogy.

The learning of music fundamentals by people older than their mid-teens resembles a remedial activity. Most information learned in the first semester of college music theory classes could and should be learned prior to students' arrival at such an institution. From my decade of directing a children's choir and teaching precollege private piano, I'll be more specific: anyone who can invert a fraction can invert a triad; anyone who can cope with the commutation principle of [3+1=4 implies 1+3=4] can read dotted rhythms. In my experience, kids enjoy learning music fundamentals; they enjoy writing, reading, playing, and singing music. Furthermore, kids learn music fundamentals faster than do adults, but this should not preclude adults from learning at their own, perhaps slower, pace. The pace, sequence, and context of music fundamentals learning need to fit a learner's individual style.

The context of music fundamentals is fraught with tension among theorists, as evidenced by Fred Maus's 1993 pronouncement that "theorists . . . sometimes refer to the core as 'Schenker and sets'."[5]

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[4]Bruce Campbell, review of *Guidelines for College Teaching of Music Theory*, by John D. White, *Journal of Music Theory* 26 (Fall 1982): 356.

[5]Fred Everett Maus, "Masculine Discourse in Music Theory," *Perspectives of New Music* 31 (Summer 1993): 264-293.

Pedagogical philosophies of Heinrich Schenker,[6] Arnold Schoenberg,[7] and Nadia Boulanger[8] augment the discussions in which their adherents engage. I hope that any pedagogical approach to fundamentals will enhance subsequent learning of Boulanger, Allen Forte, David Lewin, Schenker, Schoenberg, jazz/rock, and other pedagogical methodologies. At the very least, pedagogical approaches to music fundamentals should not make students dislike learning music. Ideally, students should enjoy learning music fundamentals and be motivated by their learning to pursue more advanced studies.

Learning methodologies and theories comprise a hotly debated area, especially in theory pedagogy. Research from areas such as psychoacoustics and linguistics is beginning to influence our views. Wayne Slawson has tailored reader-friendly summaries of psychoacoustical research.[9] Music theorists have shown interest in George Lakoff's concepts of categorical thinking. However, his consideration of "focal red"[10] has no aural analog; there is no "aural 'A'." Stanley Fish's concepts of interpretive communities[11] seem particularly valuable for musicians. Standards of pitch, tempo, and timbre are those on which communities of musicians agree. Music theory pedagogies reflect these complexities of cultural contexts.

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[6]Heinrich Schenker, *Free Composition*, trans. and ed. by Ernst Oster (New York: Longman, 1979).

[7]Arnold Schoenberg, "Teaching," in *Style and Idea*, ed. Leonard Stein (Berkeley: University of California Press, 1984), 365-390.

[8]Nadia Boulanger, *Lectures on Modern Music* (Houston, TX: Rice University, 1926).

[9]Wayne Slawson, *Sound Color* (Berkeley: University of California Press, 1985), esp. 95-115.

[10]George Lakoff, *Women, Fire, and Dangerous Things: What Categories Reveal About the Mind* (Chicago, IL: University of Chicago Press, 1987), 310-311.

[11]Stanley Fish, *Is There a Text in this Class? The Authority of Interpretive Communities* (Cambridge, MA: Harvard University Press, 1980).

The articles by the director of the Eastman School of Music, and the deans of the Schools of Music at University of Michigan and University of Southern California—grouped as "Music Education and Public Policy" in the Winter 1994 issue of *Music Perception* — form a valuable resource for music theory pedagogy.[12] As Robert Freeman notes, "Many fewer acoustic instruments are sold, but a huge industry involving instruments manipulated electronically has taken its place."[13] That industry, including the recording industry in all its manifestations of tapes, CDs, CD-ROMs, and music videos, forms a significant segment of the United States's gross national product and international market. Obviously, the extent to which we promote musical creativity has some influence on the United States's international trade status.

Some of us may be dismayed at such crass commoditization of our musical art. (Personally, I am confounded by it; I decided to become a music theorist at age fourteen and never even learned to run a cash register.) As one who holds to poststructural constructs of individual and multiple conceptual sites, I am not proposing this commoditization as a unitary, objective truth, but I am willing to consider its implications. I am reasonably convinced of the emerging centrality of technology to music theory's development; I even "write" these words on a computer keyboard, watching them appear on the monitor.

Most students of this generation come to the learning of music fundamentals with a complex knowledge of technology. For example, one adult visitor to my university preschool wanted to see the preschool's computer-assisted instruction (CAI), but did not understand how to start the software. The visitor approached one of the three-year-olds at the sand table, who reluctantly left the project at hand, loaded a floppy into the nearest personal computer, and started the program; the child checked with the visitor ("Ya got that?") and, receiving an affirmative, returned to the sand table.

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[12]Robert Freeman, Paul C. Boylan, and Larry J. Livingston, "Music Education and Public Policy," *Music Perception* 11 (Winter 1993): 197-217.

[13]Robert Freeman, "America's Musical Life in the Century Ahead," *Music Perception* 11 (Winter 1993): 197.

Most kids are accustomed to slapping in an audiotape, a videotape, or a compact disc before they get to junior high; they have basic computer skills before they get their drivers' licenses. Use and interconnection of these technologies in music theory pedagogy make common sense, especially at fundamental levels.

Once we can agree on some basic terminology and concepts in learning theories for music, how do we define our learning goals and how do we measure our students' achievement of such goals? The musical world(s) need our assistance as theorists in determining these definitions and measurements. As an indication of this need, I have data I consider to be persuasive based on a total of approximately 100 music-student subjects drawn from three sources: a local community college, second-semester freshman university classes, and incoming graduate students who failed the entrance exam at the University of North Texas. The pretest data show no significant differences in aural skills among the three groups.[14] The graduate students in the study include a healthy proportion of international students. Undergraduate degrees in music are being given to people who cannot score significantly higher on an ear-training test than our second-semester freshmen, a group that likewise includes many international students. I share this information with the incoming graduate review class students; they find it to be an unpleasant reality check.

As a discipline, what standards have we established by which we measure students' learning of music fundamentals? As a music theorist, how do I review a commercially published package that proposes to teach these fundamentals? When the Reviews Editor asked me to examine Tom Manoff's *The Music Kit*, I considered three issues: the relevance and potential market for the package, the function and context of theory pedagogy, and my evaluative basis. To supplement my views, I consulted several colleagues and have included written evaluations by members of one of my graduate au-

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[14]Philip Baczewski and Rosemary N. Killam, "A Measurement of Musical Cognition through Responses to Complex Stimuli" (Paper presented at the Texas Society for Music Theory Conference, Beaumont, TX, 1994).

ral skills classes and those of my son, a country/western musician who teaches video production.

The Music Kit package itself is fairly extensive, with two separate volumes and an option of Apple II- or Macintosh-based software. The third edition of *The Music Kit Workbook* is laid out in twelve chapters, the first ten of which are enhanced by computer-assisted packages. Both the Apple II and the Mac packages are self-sufficient enough to make sense even without the actual workbook, though they relate directly by page numbers to the workbook.

The workbook chapters focus on the following topics: pitch notation; piano keyboard, key names, and enharmonic spellings; intervals; major scales and intervals up from tonic; major key signatures, cadence, and phrase forms; interval identification by half-step content and interval inversion; minor scales and key signatures, and chromatic scales; triadic harmony, non-harmony, and chord voicing; diminished and augmented triads, and motivic concepts; diatonic seventh chords; melody harmonization and accompaniment; and modes, pentatonic scales, and form.

The *Rhythm Reader and Scorebook* volume's twelve chapters cover the following: quarter and eighth notes, double bars, and repeats; rests, time signatures, tempo, and pulse division; eighth rests; values greater than the quarter; rhythmic values: dotted notes, ties, and beams; dotted notes in context; sixteenth notes in context; simple and compound meter; superimposed metric values; meters with other than the quarter note pulse; syncopation; and mixed meters and unmetered music. The final 40 pages are called a *Scorebook*, and present music grouped under four headings: melodies from around the world; songs and ballads; canons, rounds, and part songs; and the classical heritage.

I have incorporated into this review the evaluations completed by the students in my graduate review aural skills class, spring 1994. Ten of the students reported their preliminary use of the software/tape. Nine students wrote essay evaluations. These students received extra credit for their completed evaluations. The students' backgrounds were diverse: several of these students were performance teaching fellows; several of them had part time and occasional jobs as musicians; and one of them had to arrange to make up work from several class sessions missed because he was flying

to and from professional operatic engagements. These are people more engaged in the active professional business of musical performance than I; their evaluations offer pragmatic information. Most of their comments (including those of my son) were favorable and are excerpted below:

Rhythm Tape

"The tape for the *Manoff Music Kit* was wonderful to listen to because it made doing rhythms fun . . . [but] the tape would help students to practice rhythmic dictation better if it did not have such fast tempos, especially in exercises 1 through 12."

"The tape had no identification of the exercises, like 'This is number one. It is in 4/4 time.' On some of the exercises, the instructor on the tape did not even count off. Instead, there was a drum beat for a measure or so before the exercise was given. I do not think that this is enough preparation for the student. Many times I was caught off guard when the exercise actually began because I did not know what the time signature was."

Apple II Software

"This program runs on my Apple II GS with ease. . . . Using the alpha keys to make menu selections may have been necessary in years past, but I cannot imagine why the update has not included mouse support. Color graphics and different fonts would make this program much more fun to use. I understand the limitations behind using the on-board speaker for tone generation, and have run into this problem on other programs. Nevertheless, speaking as a musician with an ear for quality sound, I must say that the sound was annoying. . . . I found the program easy to use, but not very interesting."[15]

"This software is a good tool to teach the principles of music because it is organized and follows a logical pattern. . . . The screen is very dull and boring. . . . The system does not remember the key

[15]Walter Killam participated in this review.

strokes done during processing time, which facilitates errors on the part of the fast-typing user. . . . I like the grading system."

"Mentally easier to use as the program runs slower and you have more time to enter your answer. . . . There were too few exercises given."

Macintosh Software

"I was very impressed with the way you could review the questions answered incorrectly. I also liked the way the time it took to answer the questions was recorded so that, even if you answered them correctly, you still had the challenge of working to improve your speed. . . . [*The Music Kit*] would be especially useful for a first-year college music theory class or an advanced high-school function."

"[T]he first few sections were pretty easy and trite for college musicians. . . . The rest of the sections were very good for review for everyone from upper-class bachelor's to master's students. I found that I was quite rusty in some areas of theory."

"It comes with a book though the program runs independently. Exercises 8-10 are especially helpful, . . . [and] provide a visual image of the chords. . . . This program . . . should not be considered as an 'all in one' program. Exercises that could be included in future versions are, for example, two-part harmony and chord progressions."

Student Comparisons of the Apple II and Macintosh Software

"*The Music Kit* computer program and *Music Kit Workbook* provide a motivating and creative way to learn the fundamentals of music theory. . . . Although the workbook is quite comprehensive and visually stimulating, the computer gives the students aural feedback, which helps to train their ears and eyes simultaneously. I would probably use the Macintosh version. . . . On the other hand, if Apple[II] computers only are available, then I would definitely use that version because it is of equal educational value."

"I feel this program would most benefit the early to intermediate student as a comprehensive review or overview. . . . [I]deal . . . for junior to high schools, possibly even elementary schools. . . . I

do have some computer experience, but yet when using this program I found it quite difficult to get going. When a student or teacher pulls this program from the box, unfortunately the last thing on their minds would be to read the in-depth instructions."

"[O]ne of the best basic music theory programs I've seen. . . . I think it would be perfect for use in any public school music program. . . . [S]ome of the shortcomings I found [were that] some sections in the workbook tend to be too repetitive. . . . There comes a point when one starts hating the program. I also think that if the company that produces the program wants to sell more, it should produce the kit in a PC format also."

"[U]sing the arrow keys and space bar, while seeming old fashioned, helped to alleviate many 'physical' errors. Some people might say that it takes too long to bother with the arrows, but I think it keeps you from being in too big of a hurry and making stupid mistakes. . . . If I were to teach in a public school system, [and] if I did not have the budget needed to purchase the Macintoshes, I would be just as happy with having the kids work with the Apple II. I don't see there to be any great loss of educational power between the two."

"I personally liked better the Macintosh software. [It] is obviously more colorful. . . . [T]he mouse is unforgiving and most of the errors can be attributed to lack of accuracy with the mouse."

"The Apple II software is much easier to work with than the Macintosh. One of the problems with the Macintosh is that it requires good hand coordination.
. . . Approximately 95 percent of the responses that I got wrong were because the mouse slipped or was not just where the computer would register it as a correct response."

Finally, I think *The Music Kit* serves the needs of learners in fundamentals as well as anything else I have encountered, but I have no data to prove this. The product seems shaped by the technological means available to it; timbre is not explored, probably because the Apple/Mac platform for which the CAI portion was written will not explore timbral manipulation. Lack of some evaluative mechanism for the rhythmic portion on the Mac is particularly puzzling; the software presents a graphic representation of the rhythm

presented and of the student's response, but gives no diagnostics, such as: "you ended up about 10 percent behind the beat," or "your dotted rhythms are inaccurate." Nor do I understand why all of the intervals and triads played were in ascending pitch order; any beginner who wants to learn "The Star-Spangled Banner," "Dixie," or the last phrase of "Silent Night" needs to learn triads in descending pitch order as well.

Why does *The Music Kit*, as most fundamentals books, insist on students learning all key signatures at the same time? As a musician, I can appreciate that early learning of the multiplication tables empowers students to check the answers produced by their calculators: if you want to know whether you have the money for four $.39 candy bars, plus 7% sales tax, knowing only your "threes table" will not be much help. But very few beginners play in keys of over four sharps and flats. If they do, the "rule of seven (the chromatics in a key signature plus those in its chromatic inflection = 7)" gives them the answer. Why browbeat beginners through all the key signatures in the same unit? Most beginning instrumentalists learn one or two scales a week; why not spiral through these learnings, as Jerome Bruner advocated so many decades ago?[16] Finally, I am troubled by the collection of a group of scores that includes no compositions by women or African American composers.

At my request, the University of North Texas's interim chair of Music Education[17] briefly skimmed the *Music Kit Workbook*. His immediate reaction was that the order and presentation are typical of the genre, but do not encompass all of the dimensions of musicianship that might be desired.

As theorists, we are sent notices on the wide variety of new music fundamentals texts. This journal lists and reviews many of them, so I consider any listing of these texts as outside the scope of this review. However, some of us may not be so familiar with commer-

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[16]Jerome S. Bruner, *Toward A Theory of Instruction* (Cambridge: Harvard Unviersity Press, 1966). Janice T. Gibson summarizes Bruner's and others' theories of cognitive development in *Psychology for the Classroom*, 2d ed. (Englewood Cliffs, NJ: Prentice-Hall, 1980), 50-53.

[17]Dr. Roger Warner, Interim Chair of Music Education, interview by author, University of North Texas, Denton, 15 May 1995.

cial products incorporating computer technology to teach music fundamentals. Sources for this information include the Association for Technology in Music Instruction *Technology Directory*,[18] the back pages of any of the commercial magazines devoted to personal computing, and stores selling software. In addition, Roger McCrea and Craig Harms provided me with listings of a sample of software available for music education; they are willing to provide more information to individuals interested in product availability.[19] My personal viewpoints on music software evaluation were published some years ago and I will not belabor them here.[20]

The music theory pedagogy community needs better means by which to help students learn music fundamentals; *The Music Kit* provides a diverse and earnest learning environment. The music profession, as an interpretive community, needs expanded approaches to fundamentals. I doubt that as an interpretive community we will arrive soon at consensus on pedagogical philosophies. But then I doubted that the Berlin Wall would come down. If the world community can cope with the removal of the Berlin Wall, there may yet be hope that the music theory pedagogy community can come to some agreements on learning approaches. Publishers and authors (and even teachers and students) might benefit from

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[18]The ATMI *Technology Directory* is available through membership in ATMI. Contact Peter Webster, ATMI president, School of Music, Northwestern University, Evanston, IL 60208-1200. E-mail: pwebster@nwu.edu

[19]Roger McCrea is affiliated with Temporal Acuity Products, Inc., 300 120th Avenue, N.E., Building 1, Suite 200, Bellevue, WA 98005; Craig Harms is affiliated with Creative Consultation Service, P.O. Box 331, Woodland Park, CO 80866.

[20]Rosemary N. Killam, "An Effective Computer-Assisted Learning Environment for Aural Skill Development," *Music Theory Spectrum* (6, 1984): 52-62; Rosemary N. Killam, Philip Baczewski, Antoinette Corbett, Paul E. Dworak, Jana Kubitza, Micheal Morgan, and Lawrence Woodruff, *College Music Symposium* 21 (Fall 1981); Robert W. Ottman, Rosemary N. Killam, Robert M. Adams, W. Kenton Bales, Steven V. Bertsche, Leslie C. Gay, Donald B. Marshall, Daniel A. Peak, and Douglas Ray, "National Consortium of Computer-based Music Yearbook," *Journal of Computer-based Instruction* 6 (1980).

any small agreements we can reach. Does anyone out there have any ideas on how we might begin negotiations toward tentative scheduling of sessions for discussion of possible agendas that might consider such preliminary agreements?[21]

[21]I thank members of my Music Theory (MUTH) 5382 class, who provided comments: Brian Dollinger, Felix Cortes, Portia Harper, Andy Heglund, Brad Ikard, Irene Koh, Rob Langer, Feng-Yi Lin, Scott McCloud, Elyse Roberts, Timothy Tucker, Regina Walters; and Walter E. Killam, active member S.B.E., who provided a written evaluation of the Apple II software.

Additionally, I thank Thomas Clark, Thomas Sovik and Linda Strube for advice on the review's content and style.

Readers' Comments

Some Uses of Diatonic Interval Cycles for Recognizing Chord Inversion

David Pacun

Even good students sometimes have difficulty learning how to recognize chord inversions on paper. The two common devices, figuring out how the individual pitches form a stack of thirds (then counting the half-steps) or memorizing the seven basic triad types (some kind of A-C-E, B-D-F, C-E-G, etc.), are both time consuming and cumbersome. Recently I have had great success adapting John Clough's work on diatonic interval cycles to the problem of chord inversion.[1] Students need only memorize one 'fact' and follow three easy steps.

1) Create an extended diatonic thirds cycles, i.e. no sharps or flats.[2]

A - C - E - G - B - D - F - A - C - E (etc.)

2) Map the notated pitches onto the thirds cycle, ignoring for the moment any sharps or flats in the music. The thirds cycle will automatically 'stack' the pitches in the correct order with the root on the left. (Students will have to remember to refer back to the music for sharps or flats in naming the exact triad.)

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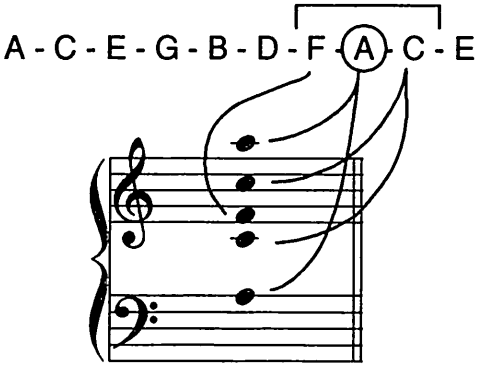
[1]John Clough, "Aspects of Diatonic Sets," *Journal of Music Theory* 23/1 (1979): 45-61. John Clough, "Diatonic Interval Sets and Transformational Structures," *Perspectives of New Music* 18/2 (1979-80): 461-482. John Clough and Gerald Myerson, "Variety and Multiplicity in Diatonic Systems," *Journal of Music Theory* 29/2 (1985): 249-270.

[2]The extended cycle ensures that students will not run out of room and that the pitches will stack as thirds without having to wrap around the cycle. I would like to thank Paul Garstki of Goddard College for his help in preparing the examples.

3) Circle the lowest notated pitch; the first pitch (reading left to right) will indicate root position, the second pitch first inversion, the third pitch second inversion (see Ex. 1).

Example 1. Mapping a first inversion F triad onto a diatonic thirds cycle



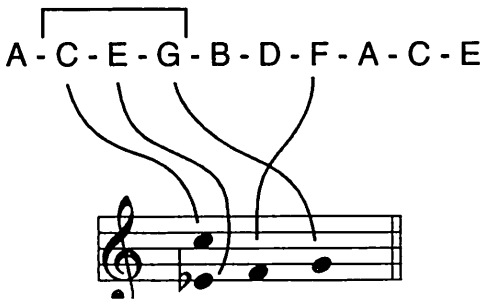
This method works just as well with seventh chords, only circling the fourth pitch indicates third inversion. In simple textures, passing tones and neighbor notes between any two thirds will appear outside the 'stack of thirds' and thus be easily visible as nonharmonic tones (Ex. 2).

However, students will have to carefully evaluate more complex textures as well as neighbor tones 'below' the root or 'above' the fifth (as these will create two possible chord types) and passing and neighbor tones in seventh chords (see Exs. 3 and 4).

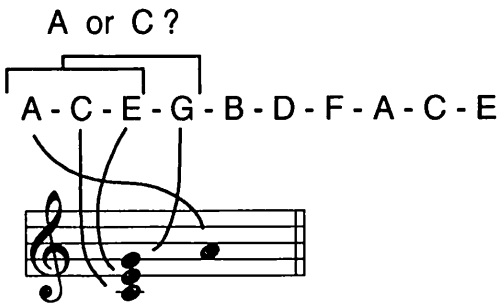
The diatonic thirds cycle will not automatically yield the proper chord quality, but can function well with standard tricks, i.e., that all *natural* fifths are perfect except B to F. These natural fifths are present in the diatonic thirds cycles and can be derived by extracting every other pitch.[3] Since the outer interval in the triad is quickly

[3]Clough provides a formal description of extraction and its complement *interpolation* in "Diatonic Interval Sets," 476-77.

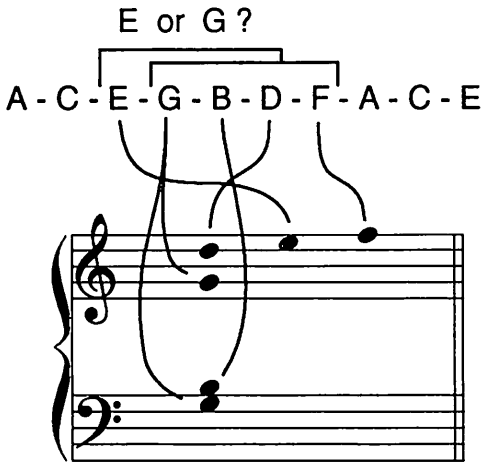
Example 2. Nonharmonic tone between the third and fifth



Example 3. Neighbor tone above the fifth



Example 4. Passing tone between the fifth and seventh



calculated from the thirds cycle, students can develop their own tricks and short cuts in order to evaluate the inner intervals and hence the chord quality.

Using this method, my nonmajor music theory class has successfully navigated the first 25 measures of Bach's *C Major Prelude* (WTC I) with few or no errors and practically no confusion.[4] More importantly, students learn how to think about music structure on different levels—thirds and fifths—and how these different levels interact.[5] This method is not fool proof and careful listening and ear training are still critical for understanding the musical point to inversion. Nevertheless, this method should allow students to grasp the basic mechanics and surmount the initial hurdles with ease.

---

[4]Measures 26-31 contain numerous suspensions over a dominant pedal—a difficult formation to grasp at sight for non-majors.

[5]One can also relate seconds (and hence sevenths) to the thirds and fifths through extraction or interpolation. I have my students memorize all possible diatonic interval cycles at the start of each semester. A quick analysis shows them how melodies tend to move by step, how chords are comprised of thirds, and how chords often progress by fifth.

LETTERS TO THE EDITOR

Corrections/Additions to Volume 8 (1994)

1. On page 26 of Volume 8, in the article by Charles Burkhart entitled "Mid-bar Downbeat in Bach's Keyboard Music," the first line of text was inadvertently omitted. The paragraph should have begun:

> "At bar 9a of this piece some players might take the R.H.'s a1 to be a suspension."

We appreciate Professor Burkhart's pointing out this omission and apologize for any inconvenience it may have caused.

2. From Craig Cummings:

> "I failed to include a citation in my article 'Three Introductory Miniatures for an Undergraduate Twentieth-Century Analysis Class,' which was published in volume 8 of this journal. Example 3 on page 165 should have included a citation reading:
>
> *The author wishes to thank Professor Mary Arlin for permission to use this Example.*"

1995 BIBLIOGRAPHY

NEW BOOKS

Damschroder, David. *Listen and Sing: Lessons in Ear-Training and Sight-Singing*. New York, NY: Schirmer Books, 1995. An extensive (over 650 pages) one-volume text that integrates the study of ear-training and sight-singing. It is designed for a two-year sequence of music theory and covers intervals, chords and their inversions, sequences, modulation, and rhythm and meter. Many different kinds of exercises, as well as music from the eighteenth- and nineteenth-century repertoire, are included: solo melodies, duets, accompanied solo melodies, etc. The text is designed to support several different methods of solmization and different analytical symbols. Accompanying four-cassette set for dictation exercises in the text as well as additional melodic and harmonic exercises.

DiStefano, Joseph K., and James A. Searl. *Music and Materials for Analysis: An Anthology*. New York, NY: Ardsley House Publishers, Inc., 1995. Sixty-five musical examples, ranging from Gregorian chant to works by Boulez and Duckworth. Materials preceding each example include a list of terms, study questions, suggested additional activities, and blank manuscript paper for compositional projects.

Dorr, Joyce. *Introductory Music Theory*. Belmont, CA: Wadsworth, 1995. CD of musical examples, instructor's manual, workbook with exercises and scores.

Sorce, Richard. *Music Theory for the Music Professional*. A comparison of Common-Practice and Popular Genres. New York, NY: Ardsley House Publishers, Inc., 1995. Includes the material of a standard harmony text, but many chapters address the application of concepts in both traditional and popular styles of music. Literature examples are mostly in piano or lead-sheet format.

NEW EDITIONS

Forney, Kristine. *The Norton Scores*. 7th ed. New York, NY: W.W. Norton. With three- or eight-CD or cassette set.

Harder, Paul O., and Steinke, Greg A. *Basic Materials in Music Theory: A Programmed Course.* 8th ed. Boston, MA: Allyn and Bacon, 1995. Instructor's Manual.

Manoff, Tom. *The Music Kit.* 3rd ed. New York, NY: W.W. Norton, 1994. Workbook, rhythm reader and scorebook, cassette tape. CAI version for the Macintosh by John Miller and Peter Hesterman.

Ottman, Robert W., and Mainous, Frank D. *Rudiments of Music.* 3rd ed. Englewood Cliffs, NJ: Prentice Hall, 1995.

CONTRIBUTORS

Lyle Davidson is chairman of the Undergraduate Theory Department at the New England Conservatory of Music. He has been a research associate at Harvard Project Zero and has worked in developmental psychology at Boston University. His publications have appeared in *Music Perception, Sonus, Music and Child Development, Journal of Aesthetic Education, Generative Processes of Music* (Oxford Science Series), and the *Journal of Music Theory Pedagogy.* He is currently Director of Research at the Lincoln Center Institute in New York City.

Alan Fletcher is a prolific composer whose works are frequently performed in Boston and throughout the country. He studied at Princeton University and the Julliard School, with Edward T. Cone, Milton Babbitt and Roger Sessions. A frequent lecturer with the WBUR Spectrum series and for New England Conservatory's Speaking of Music series, he teaches composition and theory at the Conservatory, where he is also Dean of the Faculty and acting Provost.

John Hanson is an Associate Professor of Music at Binghamton University where he teaches theory and musicianship courses and supervises teaching assistants. His areas of interest include pedagogy, perception, and counterpoint. He has published articles in *College Music Symposium, Theory and Practice,* and the *Journal of Music Theory Pedagogy.* He is a founder and past president of the Music Theory Society of New York State.

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GUIDELINES FOR CONTRIBUTORS

1. Articles on any aspect of teaching or learning music theory will be welcome. Contributions will be judged on originality, relevance, interest to a diverse audience, and clarity of writing.

2. Manuscripts should be typed double-spaced (including footnotes, references, and quotations) on 8 1/2 x 11" paper with at least one-inch margins. Please submit *five* clear copies. All footnotes, tables, figures, musical examples, and other material should be placed at the end on separate sheets with an indication of where they fit in the text. Long musical examples and complex diagrams or charts should be avoided when possible. Please also avoid musical symbols (i.e. notation) within the running text.

3. The author of an accepted manuscript will be asked to revise the article (if necessary) to fit the style guidelines of the journal and to submit it electronically in either DOS or Macintosh format. Authors will be sent guidelines for style and guidelines for electronic manuscripts. Please do *not* send disks until requested to do so.

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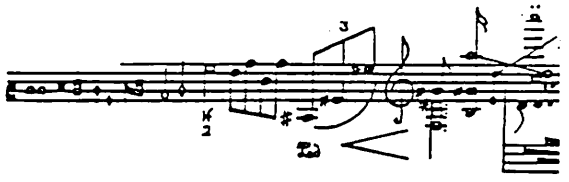

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