Why the Gulf Between Music Perception Research and Aural Training?*

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I have irritated a number of music theorists with two musical listening examples over the past few years. One of these is the first movement of a Mozart sonata (in C major, K.309), which was altered through MIDI editing such that it ends in a key a perfect fourth above its beginning tonic. In the article from which this example was adapted, Nicholas Cook (1987) reported that listeners almost never indicated that they were aware of this fact. The second example simply consists of two pairs of stacked trichords, adapted from a study reported by Don Gibson in 1986. Although the second pair is more similar in terms of intervallic content, and, therefore, generally would be considered more similar perceptually, Gibson reported that the listeners in that study were evenly divided in their choices of more similar pairs. The studies from which these two examples were taken seem to demonstrate that we cannot perceive those pitch relationships described by music theorists' two leading analytic systems—Schenkerian analysis and pitch-class set analysis. But music theorists point out that this is a straw argument: they argue that neither theory was advanced as a perceptual theory, and that, therefore, it is unfair to criticize either theory from the perspective of music perception. Nicholas Cook has since gone so far as to say that theories of music and theories of musical perception are fundamentally different, as they should be: "a psychological theory of music is successful to the extent that it reflects perception. 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. When a theorist analyzes a piece of music, [he or] she is taking up an interpretive stance in relation to it . . . From this point of view, the psychologist's perceptual model is totally inappropriate because . . . 'the resultant theoretical construct will be devoid of critical content: It cannot challenge our pre-formed responses because it sets out to reproduce them.' The aim of music theory, then, is to go beyond perception. In fact, you might put the point polemically and say that, from the music-theoretical point of view, an analysis can have value only to the extent that it *deviates* from perception. . . ." (Cook, 1994, p. 89)

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I've just laid the groundwork for a point I want to make at the end of this essay, but first I want to talk about music perception research. As we all know, this research area has undergone a dramatic growth phase in the past 20 years—we're all aware of the new journals and the many research conferences that have focused on work in this arena. Four years ago, I decided to find out how much information transfer has taken place from the research journals of music cognition into the college music community. It seemed to me at that time that the logical place to find a connection point for music cognition research, if it existed, was in the area of aural training.

What I found was that there hasn't been much information transfer at all—although there are some important exceptions, such as work done by Steve Larson at the University of Oregon and Gary Karpinski at University of Massachusetts. By and large, college-level aural training programs have been disappointingly slow to pick up on this new information. And that's what I want to talk about today. I've skimmed through the programs for several recent MENC conferences, and I find that this special-interest group has had a number of outstanding guest speakers . . . and that the topics have seemed to center on how music cognition research is informing us about how we hear, perform, and learn music. But if this research has so much to tell us, and I sincerely believe that it does, then why isn't the aural training establishment listening?

When I began looking at music research journals that report studies on aural skills pedagogy, I found little evidence that anyone in the aural training classrooms was reading much of what was in the music cognition journals. In fact, when I looked at one of the leading journals, the *Journal of Music Theory Pedagogy*, it seemed to me that most of the articles it contained on aural training could have been written a century ago. There were debates on such hot new topics as the relative merits of fixed versus movable *do*, the best procedures for administering dictation drill and testing. . . . To judge from much of the content of these journals, things haven't changed much during the past several decades. One obvious new vein of interest in recent years has been a big growth in music technology, but there's an old-wine-new-bottles feel to much of this work: we have a different delivery system, but most of us are selling the same old product. This might mean that sight-singing and dictation make up the perfect teaching regimen, but if we make that claim we're going to have to find some way to deal with some pesky counter-evidence.

I began to wonder if the journals really mirrored life out in the aural training classrooms. Three years ago, I began an onsite review of aural training programs in a few dozen of the schools of music and conservatories that I argued were so-called "first-tier" institutions. My rule for deciding that was that the institution either had to be a top-prestige school, or it had to have one or more people on its faculty with a national reputation for their publications on aural skills pedagogy, or both. What I wanted to do was either verify what I thought I saw in the journals, or find solid evidence that changed my mind. So far, I've been to Indiana University, University of Arizona, Northwestern, University of Kentucky, Ball State University, Arizona State, Florida

State, Juilliard, Queen's College (CUNY), University of Wisconsin (Madison), College-Conservatory of Music (University of Cincinnati), Wright State University, and McGill University—and I have eight schools to go.

At each school, I observed two or more aural training classes, observed practice lab activities when schools had an aural training lab, and interviewed the person in direct charge of the undergraduate aural training program. I encouraged each interviewee to take the lead as much as possible, trying to limit my participation simply to keeping the discussion related to the ends and means of aural training. I tape recorded each interview, later made a verbatim transcript of the tape, and then sifted through the content of the remarks, looking for points of similarity between goals and classroom activities.

What have I found out so far in this review? One problem that quickly became apparent in the transcripts has to do with a general lack of focus in defining educational objectives in aural training. A question about "the goals of aural training" might be answered by one person with broad, platitudinous philosophical statements ("I want to have students who hear all that there is to hear when they're listening to music. . . ."), or it might be answered by another in relatively narrow descriptions of behaviors ("conventionally, we all emphasize dictation . . . really focusing on . . . melodic and harmonic patterns. . ."). Goal statements from these interviews fell quite clearly into two levels of specificity: ENDS (the over-arching, broader aspirations of aural training together with the general exit-level skills/capacities of students for whom we've achieved our mission) and MEANS (the more-specific, observable exit competencies that we expect of our successful students).

Judging by the institutions I have visited, there seem to be two broad schools of thought in aural training, a mainstream pursued in 11 of the programs and a secondary stream pursued in just two. But these streams don't flow cleanly along the lines of the often discussed distinction between schools of music and traditional conservatories. The broadly stated goal in the mainstream is a well developed "inner ear"; the primary specific objective is good relative pitch and a solid sense of tonality, described as a clear aural sense of scale-step. The primary—almost sole—choice of classroom/lab activities is traditional sight-singing and dictation. In the secondary stream, the broadly stated goal is an amalgam of aural mastery and performance skill: aural training and performance are viewed as inseparable, but for varying reasons. Classroom and lab activities vary widely, depending on these reasons.

I can illustrate the split perspectives in this secondary group by pointing to Juilliard at one extreme and the University of Kentucky at the other. These are two truly first-rate programs, but light-years apart in philosophy. At Juilliard, you find a solid regimen of dictation and sight-singing with fixed *do*. The leading rationale for the use of fixed *do* among those I have interviewed who use it, by the way, has nothing to do with developing absolute pitch. Instead, it's that many students will be performing under European conductors—in particular, conductors from romance-language countries—and fixed *do* is viewed as a performing musician's Esperanto. The feeling that seems to drive the program at Juilliard is that *aural training is the means, intelligent musical performance is the end.* At the University of Kentucky, things are

	MAJORITY VIEW	MINORITY VIEW
Ends:	**Highly Focused "Inner Ear": ability to imagine musical sound** Strong connection between eye and ear: ability to "see" the sounds, "hear" the notation	**Development of the "whole musician"** Performance skills, good intuitions
Means:	"We all emphasize dictation . . . really focusing on patterned melodic and harmonic patterns . . . we need some kind of solfege system, and the reason for that is to try to encourage them to fit the pitches into the context of the key. . ." "I think that we want them to feel the 'one-ness' of 1, the '5-ness' of 5, and so on . . . movable *do/do* minor would be okay—the type of system isn't as important as having SOME system. . . . you kind of get a rosary effect from any [system of] solfege or whatever you're using: you just have to have something to hang on to. . ."	[The traditional goal of aural training has been] "is to develop a musical ear. . . to develop a mental image of what's happening. And the evaluation of that is: can we take sound and put it into symbol, or take symbol and put it back into sound . . . the dictation process itself is a very analytical thing. It's very comfortable for theorists, because theorists start analyzing . . . So, I guess that's one of our overall goals, is to try to bypass the analytical in favor of the intuitive. We try to use whatever means we can—whether it is improvisatory sorts of things on their instrument or through technology—to get people responding as intuitively as possible, and less analytically."

very different: numbers are used for sight-singing, with "1" applied to tonic in both major and minor. There is virtually no dictation until well into the second year; the faculty regard dictation as a "culminating activity." Until that culmination, the primary dictation surrogate is performance—using the students' primary instruments, Orff instruments, and MIDI keyboards. The prevailing philosophy at the University of Kentucky seems to be that *performance is the means, aural training is the end.* Different as they are in many respects, both programs are grounded on a belief that musical performance and aural skills are closely linked. Also, both programs have undergone a clear shift toward the use of "musically realistic" and "context rich" musical examples (melodic and harmonic patterns that are 2, 4, or more phrases long, for example), and away from singing and dictation activities involving "atomistic," "musically impoverished" drill-and-test items, such as isolated melodic or harmonic intervals.

If there are any feelings common among almost all (but not all) interviewees, it's that the music cognition research literature doesn't have much to offer aural training. I heard various reasons for this feeling, but the reason I heard most often was that there's not much real music in music cognition research. Stimulus patterns of even the more musical studies resemble the kind of aural training exercise many instructors—and particularly in the programs I have characterized as the "secondary stream"—are trying to discard: "atomistic," "musically impoverished" tonal and rhythmic patterns that are easy for the teacher to generate, present, and grade—but patterns that may not have any other attractive features.

So, where does that leave us? The picture seems to be that—even at some of the schools I'd argue are leaders of the pack—we have music education being practiced by music theorists and composers, assisted by teaching assistants and sometimes by other faculty members whose primary qualification is that some administrator decided that their teaching load was light. Even many of the leaders in the aural training field freely admit that they don't have the training or the experience to be able to wade through an article in *Psychomusicology* or *JRME*. Small wonder that issues in the field seem not to change much from year to year: it appears that at most schools most of the time, aural training is a musical catechism handed down essentially intact from generation to generation. So, I can ask the pious, rhetorical question about how much of what goes on in aural training class is there because it is most advantageous to the student, and how much is there because it is most comfortable for the instructor, but that's the easy question. The tougher question is whether or not there are ways to improve the situation? And I think there are.

At many of the schools I have visited, I have seen a pervasive but seldom-discussed server-client mentality that separates faculty. Many of the faculty outside the theory/composition areas at these schools politely avoid getting actively engaged in aural training; although they sometimes complain about the way things are (or aren't) getting done, very few of them become directly involved in the program. There's a similar gap between the typical aural training program and the administration. Whenever I visit a school of music or conservatory, I always ask for a short interview with the top administrator, and I always ask two questions: (a) how important do you feel aural training is in your undergraduate music major program; and (b) how much do you actually know about what's currently going on in that program at your school? The typical response to the first question is strongly positive: ". . . most important courses that we teach," and so forth. The typical (but not the only) response to the second question is a smooth gloss: ". . .wouldn't want to micro-manage," ". . . haven't heard any complaints. . ."

Music theory and composition faculty often teach aural training for historical reasons—but who decreed that it must always remain this way? In fact, who says it was always this way anyway? Three of the music educators' favorite icons (Jaques-Dalcroze, Orff, and Kodàly) were "crossover artists" who became music education superstars after beginning as composer-teachers, frustrated aural training instructors. I think we sometimes spend so much

of our professional lives working within administrative demarcation lines that we begin to think that they're real. Music theorists seldom recognize that they are also necessarily music educators; and music educators probably don't recognize often enough that by necessity they are also music theorists—at least when teaching younger musicians.

Is this little observation of the field of music education close to the mark? What I think I see is that music educators often have two different teaching agendas, with the students hitting the break-point at or around age 18: music educators seem (from where I'm standing) to teach music to students below age 18, but seem to teach teaching to students age 18 and above. Let's start from Mary Louise Serafine's (1988) definition of music . . . and let's pretend we all agree with Serafine's definition,[1] whether or not you really do: which college-level courses (by her standard) actually teach music, which courses teach about music, and which courses teach about other things (such as teaching strategies, analytic techniques, and historical developments)?

I have two humble suggestions for improving the field of aural training. First, we need to increase the number of music educators working in the aural skills classrooms and practice labs. Second, we need to know much more about what we're doing in the aural skills classrooms, and thus we need to increase the number of music educators—exactly the kinds of music educators who would become involved in a special interest group on perception in MENC, for example—doing the kind of research that will tell us what we need to know. Let me elaborate just a bit on each point.

First, on the need for music educators in the aural training classrooms: this is self-evident. Aural training is a form of music education. But how well does it hook into the rest of what you and I consider to be "music education?" By that I mean, for example, how well does aural training build on preparatory music education our music majors bring to it from the public schools? Or stated the other way, how well does public-school music education prepare students to succeed in college-level aural training? If music educators don't take part ownership of college-level aural training, how is this situation ever going to change?

Second, regarding the suggestion about research: aural training is still a patchwork in American colleges and universities. It is a pastiche of observable behaviors that may or may not link directly and consistently to a corresponding set of aural skills. But we don't know exactly how these behaviors map across these skills. In fact, aural training practitioners can't even come to full agreement on what skills they'd like the successful students to possess when they exit the aural training course sequence! If there's anything we can call a national standard for exit-level competencies in college-level aural training, it may be the Graduate Record Examination Music Test. Sixty-five of the 134 items in the 1993 Music GRE involve making responses to questions about a musical example presented on audio tape . . . although it's not necessarily true that only those items involving a taped musical example test aural imaging competency. For example, it's certainly possible to invoke mental imagery of music without hearing a musical sound on anybody's part—the tester or the testee. Nor is it necessarily true that taped musical

examples necessarily invoke cognitive imagery of music, as can be demonstrated with an example from the Music GRE.

The "listen-and-respond" section of the Music GRE contains nearly half of the GRE's 134 test items, comprising about two fifths of the entire test in terms of raw score points. There are only four traditional dictation items (which together add up to 10 raw score points); most of the responses to the listening items take the form of multiple-choice questions that sometimes do and sometimes don't involve aural skills. Please look at the sample GRE items on page 45, listen to the Introduction (mm. 1–37) of the opening movement of the Tchaikovsky Fifth, and think about the kind of mental imagery each of the six questions requires of you.

I think you'd agree that some of these items are much easier to handle if you can call up a clear mental performance of the excerpt. Others, however—such as item number 102, on composer identification—can be answered correctly without any "sounds in the head." These response items—and in fact all of the "theory" and aural training items on the GRE—were constructed by music theorists. Not based on knowledge generated by their carefully designed and controlled perception experiments, but based on their notions, drawn from their training and their classroom experience, of what a music achievement test should be. For better or worse, the Music GRE seems to be becoming the nation's final examination in aural training.

I don't want to send the wrong signal here. I've served as a grader on the GRE for the past 6 years and have developed a deep respect for the thoughtful, careful work that goes on at Educational Testing Service (ETS). If there is any problem with the GRE, it is most likely with the content that ETS (1993) was given by the musicians. And it might just be entirely true that the musical content of the Music GRE indeed is quite valid—it certainly does require the kinds of response behaviors I observed in the better mainstream aural training programs around the country. But there's the rub: does a student who successfully exhibits those response behaviors necessarily possess the aural skills we agree we want students to develop? And are the activities through which we rehearse those behaviors—and the mental activities they signal—the most effective ones for developing the skills? I don't think we'll be able to begin to answer these questions until we can assemble more of the framework of a general perceptual theory of music.

I would like to close this presentation by stating a hunch, which has taken on some strength and clarity as I have observed some of our best aural trainers doing their best for their students. As we learn more about the aural skills that we want to teach the next generations of musicians, I suspect that we will begin to map a broad theoretical substrate for these skills that has at its core an intrinsic and unbreakable link between music performance skill and music listening skill. Even Edward T. Cone (1968), one of our best analytical theorists, has written that "active listening is, after all, a kind of vicarious performance..." One of several intriguing similarities among Kodàly, Orff, and Jaques-Dalcroze is that all three of them recognized, each in his own brilliant way, that physical motion (or position) and musical motion (or

97. Which of the following best represents the rhythm of the opening melody?

A. 

B. 

C. 

D. 

E. 

98. The opening statement consists of a short, two-measure melody that is then repeated, In relation to the first two measures, the melody in the second two measures is repeated
    A. a third higher, with essentially the same harmonization
    B. a fourth higher, with essentially the same harmonization
    C. at the same pitch level and with the same harmonization
    D. a third higher, with a different harmonization
    E. a fourth higher, with a different harmonization

99. In the third two-measure statement, the outer voices illustrate which of the following compositional devices?
    A. Canon
    B. Contrary motion
    C. Suspension chains
    D. Triadic arpeggios
    E. Stretto

100. In relation to the opening tonic, the excerpt ends on
    A. I
    B. i
    C. V
    D. III
    E. VI

101. The excerpt is scored for strings and
    A. clarinet
    B. bassoon
    C. low brass
    D. oboe
    E. alto flute

102. The excerpt is the opening passage of a symphony by
    A. Schumann
    B. Beethoven
    C. Bruckner
    D. Tchaikovsky
    E. Mendelssohn

position—be it rhythmic, pitch, or both) could be linked to facilitate and sharpen students' mental imagery of music. I think it's more than coincidence that most of the instructors I've interviewed in my aural training study have noticed that although everyone recognized that you cannot perform what you cannot internally hear—that is, what you cannot cognitively control—there seems to be a complementary proposition in aural skills work that you cannot "hear" (which is to say "gain aural control of") what you cannot conceive of performing. It's widely recognized that music performance hinges on expert music listening, but it doesn't seem to have fully sunk in yet that music listening—at least, the probing, focused, and knowledge-based listening that we're trying to develop in aural training courses—is, in essence, a form of music performance.

One of the ways that performance and listening are related might be through physical motion—the kinesthetic memory of motions overlearned in instrumental music performance feeding back to help inform the music listener. Hence, the observable motions when students are taking dictation, especially when solving the tougher problems: pianists' fingers silently performing on the desktop, fingers manipulating invisible flutes or trumpets. This may be one of the main reasons voice majors often have so much trouble in aural training: their over-learned kinesthetic performance motions are all internal, and they may not have been able to find a one-to-one link between a particular muscular position or motion and a concomitant pitch, in the overt, almost-tangible way their instrumental-major peers have. The suggestion here is that, at some point in the development of the ability to generate and control a useful mental image of music, "motion" may be more than a useful metaphor: it may be a physical/physiological accompaniment to skilled analytical listening.

Who is going to do the sort of research that would begin to answer these questions—to begin to find out, for example, if the aural-kinesthetic connection is any more than a hunch? A few psychologists have become very sophisticated musically, and that sophistication is beginning to show up in their studies—but there just aren't many psychologists who are doing studies that seem to apply directly to the aural training classroom. Similarly, there just aren't many music theorists who express a deep interest in aural training, and are willing and able to get their hands dirty conducting experimental research to test their ideas. I'm afraid that, by and large, the music theory community is the wrong one to produce many of these types of researchers. Most music theorists' philosophical roots are found in the traditions of rationalism, not empiricism. Just as important—and here I remind you of the Nicholas Cook quotation at the outset of this essay—music theorists are profoundly interested in theories that guide musical analysis, and thus their idealizations are much more likely to be synchronic, visual, and map-like. Perceptual models for music, on the other hand, are necessarily diachronic, aural, and script-like. For Cook, music theories and perceptual theories are fundamentally different because they have different objectives. I certainly don't want to disparage analysis-oriented theories of music, but I do want to point out that we educator/theorists need to build and test some perceptual

theories, as well.[2] So, returning to the question of who is best equipped to do the sort of research that will begin to give us knowledge about aural training, based on evidence, rather than beliefs about aural training, based on faith? Who better than music educators?

It would have been great fun to have talked about recent research findings today, to have played some taped examples of auditory fireworks, and to have discussed what it all may mean in terms of musical thinking, musical development. I chose instead to talk on a more general level, because I think that we periodically need to stand back and reflect on issues of epistemology, of knowledge generation and transfer, and how they affect us as researchers. I hope you will agree with me that this a proper forum—perhaps the best forum one could find—for discussing the value of building points of connection between research and teaching. College-level aural training is an obvious potential beneficiary for the application of findings in music perception research—what is aural training, after all, if it is not the acquisition of cognitive skills in music—but the real connection between research and the classroom is yet to be made.

Notes

[1]Serafine's (1988, p. 70) definition of music ". . .emphasizes aural-cognitive activity—that is, thought having to do with sounds—and it excludes all such thinking that does not involve sound. 'Sound' here may be construed as including not only actual sounds in the physical environment but also mental images of sounds that occur internally—that is, sounds occurring in the imagination (the terms 'inner ear' and 'inner voice' may be invoked here). . ."

[2]Cook's opinion is certainly not universal. William Thomson (see, for example, Thomson 1991, 1993) is an eloquent and outspoken voice of the opposition, arguing that perceptual validity and psychological reality are necessary components of theories of music.

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