

## Is Twelve-Tone Music Artistically Defective?<sup>1</sup>

DIANA RAFFMAN

Worries about the artistic integrity (for lack of a better term) of twelve-tone music are not new. Critics, philosophers, musicians, even composers themselves have assailed the idiom with a fervor usually reserved for individual artists or works. Just why it is supposed to be defective is not entirely clear, however. I want to revisit these questions by way of putting some insights from music history and theory together with some insights from the philosophy and psychology of music. To find out whether twelve-tone composition is defective we will need to reflect carefully upon our concepts of music and art in general, so if all goes well our conclusions should have some broader import. Because I will be pulling together considerations from several domains, I will need to lay a fair amount of groundwork at the beginning; but once that is done, we will have a vantage on the present issues that would not otherwise be open to us.

### I

Although I will focus on the case of twelve-tone or dodecaphonic music, the questions I want to address could also be raised, indeed have been raised, about atonality in general. The twelve-tone technique is just an especially strict form of atonal composition. Let me begin by providing a bit of background for readers who may not be familiar with these idioms.

Atonality is best understood in opposition to tonality: tonal music, including *inter alia* virtually all Western concert music from the period of Bach through Brahms and virtually all Western popular music, is organized around a so-called tonal center or *tonic* pitch. Known to the layperson as the “doh” note of the famil-

1. I am indebted to Lee Brown for many, many helpful comments and conversations.

iar diatonic scale, the tonic is the most important pitch in a scale and serves as a center of gravity relative to which the other pitches are hierarchically related. Simply put, it's because of the presence of a tonal center or tonic that the music is *in a key*. Atonality, in contrast, involves the abandonment of tonal center and therewith the abandonment of our traditional pitch framework with its major and minor keys, triadic harmonic system, circle of fifths, and so on.

Atonality is thought to have its roots in the “extended tonality” of Wagner and Strauss and the (slightly later) impressionism of Debussy.<sup>2</sup> These composers began to dismantle the traditional tonal framework, paving the way for a variety of atonal pitch systems including, in particular, Schoenberg’s twelve-tone technique. Schoenberg’s principles applied only to pitch, but Milton Babbitt later extended them to rhythm, duration, and other dimensions of musical composition; the well-known term “serialism” refers to Babbitt’s multidimensional theory. For present purposes, I will talk mostly about the dimension of pitch.

Because some familiarity with Schoenberg’s system will be needed for our discussion here, let us consider briefly some of its defining principles.<sup>3</sup> (These rules are perhaps best understood as methodological ideals to which the twelve-tone composer should aspire; one rarely sees them observed strictly, even in Schoenberg.) The pitch structure of a piece of music is to be based on a specific ordering of the twelve tones of the chromatic scale (the twelve pitches within any octave on the piano keyboard).<sup>4</sup> This ordering or *row* is supposed to provide the basic organizing and unifying principle for the pitch structure of a work—being, *to that extent*, analogous to a tonal scale. Among the most important rules of the twelve-tone system, what is sometimes called the “constant circulation” rule, requires that all twelve tones be presented in a work before any one is repeated; as Schoenberg observes, the “emphasis given to a tone by premature repetition is capable of heightening it to the rank of a tonic” (1975/1941, p. 246).

Within these constraints, a number of variables allow freedom of composition. For example, the row can be stated in inversion, retrograde, and retrograde inversion, and the latter permutations can be transposed to begin on any pitch. The row can be used horizontally, in a melody, or vertically to create chords, and it can be distributed into different contrapuntal voices. Also, a principle of octave equivalence is in effect: as long as the order of pitches (pitch-classes) in the row is preserved, any pitch can be sounded in any octave. We will hear more about the perception of octave equivalence before long.

Schoenberg explains that without the familiar tonal principles to rely upon, he was forced to find new ways to construct a piece of music, a work of art:

Formerly the harmony had served not only as a source of beauty, but, more important, as a means of distinguishing the features of the form. For instance,

2. See, e.g., Schoenberg (1975/1941), p. 216.

3. See Krumhansl et al. (1987, pp. 31–35) for a lucid overview of basic twelve-tone principles.

4. In at least one passage Schoenberg claims that each piece is to be based on a *unique* such ordering (1975/1941, p. 219); but plainly this cannot have been his considered view.

only a consonance was considered suitable for an ending. Establishing functions demanded different successions of harmonies than roving functions; a bridge, a transition, demanded other successions than a codetta . . . Fulfillment of all these functions—comparable to the effect of punctuation in the construction of sentences, of subdivision into paragraphs, and of fusion into chapters—could scarcely be assured with chords whose constructive values had not as yet been explored. Hence, it seemed at first impossible to compose pieces of complicated organization or of great length.

A little later I discovered how to construct larger forms by following a text or a poem. The differences in size and shape of its parts and the change in character and mood were mirrored in the shape and size of the composition, in its dynamics and tempo, figuration and accentuation, instrumentation and orchestration. Thus the parts were differentiated as clearly as they had formerly been by the tonal and structural functions of harmony. (1975/1941, pp. 217–218)

I will say more about this fascinating passage later on. At present I want simply to note that, as it seems to me, the passage reveals an implausible conception of the role of harmony in tonal music. Schoenberg appears to observe a distinction between what I'll call large-scale or *architectural* elements of musical structure, such as “endings,” “transitions,” “codettas,” recapitulations, and movements, on the one hand, and small-scale or *local* structural events such as chord-to-chord harmonic and note-to-note melodic progressions, on the other. Though impossible to draw in a sharp or principled way, such a distinction is useful and often invoked by musicians.<sup>5</sup> Oddly, however, Schoenberg appears to view the local structural features, specifically local harmonies, as subservient to the architectural structure of the piece, as if their primary role is to aurally demarcate the architectural features that are of principal importance: “the [tonal] harmony had served not only as a source of beauty, but, more important, as a means of distinguishing the features of the form.” Claiming to have discovered how to distinguish the features of the form by other means (e.g., dynamics and tempo) in a twelve-tone piece, he writes that its “parts [are] differentiated as clearly as they had formerly been by . . . harmony.” I would suggest that, on the contrary, the local harmonies in a tonal work are typically the focal events in our perceptual experience of it. Local harmony is not at all “comparable to . . . punctuation”; if anything, it is comparable to story line. It seems to me that Schoenberg's conception of tonal harmony as revealed in these remarks is both important and tendentious, and I will say more about it later on.

Though preeminent until the 1960s, twelve-tone music has since disappeared—or, perhaps, been banished—from the musical scene. As historian K. Robert Schwarz (1997) explains,

[a] backlash against Serialism arose in the 1970's, and there was soon a profusion of Minimalists and neo-Romantics. Amid this new post-modernist

5. I discuss such a distinction in some detail in 1993.

diversity, Serialism faded in power and prestige. . . . Indeed, the very term Serialism [sic] has become so burdened with pejorative associations that even the leaders of the movement no longer wish to be identified with it. "If anyone writes program notes and says I am a Serial or a twelve-tone composer, I am infuriated," Donald Martino said. "I don't want to prejudice people with that". . . . Milton Babbitt is blunt: "[‘Serial’] is used very much in the way ‘mathematical’ has been used with regard to music, as a word of automatic, ultimate derogation."<sup>6</sup>

The current attitude toward dodecaphonic music, and atonality generally, is nowhere plainer than in the rabid diatonicism of minimalists such as Steve Reich and Phillip Glass. In the main, contemporary composers have returned to tonality.

This is an unusual situation. After all, no one today is seriously composing Baroque sonatas, or making pointillist paintings, or choreographing in the style of Petipa, but these past idioms are revered as paradigms of artistic merit. Similarly, one might have thought that the modernist transition from tonality to atonality and serialism in music was rather like the modernist transition from realism to abstraction in painting: the old recognizable landmarks are demolished and replaced by a new and unfamiliar formalism. But the analogy fails, for almost no one has trouble making sense of modernist abstraction. The harsh criticisms of serialism, by contrast, intimate that something is *wrong* with the idiom, that the idiom itself is somehow defective. What is the defect supposed to be?

Various charges have been made,<sup>7</sup> but the most interesting and philosophically important one has it that twelve-tone structures are not perceptually real. Simply put, listeners—even composers, it is claimed—cannot hear the compositional structures in twelve-tone music. Composer Fred Lerdahl writes:

Boulez's *Le Marteau sans Maître* (1954) was widely hailed as a masterpiece of post-war serialism. Yet nobody could figure out, much less hear, how the piece was serial. From hints in Boulez (1963), Koblyakov (1977) at last determined that it was indeed serial, though in an idiosyncratic way. In the interim listeners made what sense they could of the piece in ways unrelated to its construction. Nor has Koblyakov's decipherment subsequently changed how the piece is heard. Meanwhile most composers have discarded serialism, with the result that Koblyakov's contribution has caused barely a ripple of professional interest. The serial organization of *Le Marteau* would appear, 30 years later, to be irrelevant. . . . This story is, or should be, disturbing. There is a huge gap here between compositional system and cognized result. . . . This situation exists not only for *Le Marteau* but for much of contemporary music. (1988, pp. 231, 234)

6. All quotes from Schwarz are from his 1997.

7. Clearly some of the venom owes to professional turf wars in the field of music; see Schwarz (1997) for an excellent account of the period.

To be sure, twelve-tone composers were aware that listeners found their music indecipherable. But as Schwarz observes of Babbitt,

[r]ather than regretting the gap between composer and audience, [he] saw it as an inevitable result of a poorly educated public's confronting a highly specialized music. In a 1958 article, "Who Cares if You Listen?" . . . [Babbitt wrote] "I dare suggest that the composer would do himself and his music an immediate and eventual service by total, resolute, and voluntary withdrawal from this public world to one of private performance and electronic media . . . with its very real possibility of complete elimination of the public and social aspects of musical composition."

Thus the indecipherability was blamed on an incompetent audience. Lerdahl is making a stronger claim, however—viz., that even trained musicians, familiar with serial techniques, cannot hear the structure in the music:

[C]ompetent listeners to *Le Marteau*, even after many hearings, still cannot even begin to hear its serial organization. For many passages they cannot even tell if wrong pitches or rhythms have been played . . . Conditioning, in short, does not suffice." (op.cit., p. 232)

Lerdahl's charge is indeed disturbing. But why, exactly? So what if twelve-tone structure isn't perceptually real? So what if there is a gap between *compositional* and *listening grammars*, as Lerdahl characterizes it?

The relevant literature (musical, philosophical, psychological) does not contain much in the way of explicit answers to the latter question.<sup>8</sup> However, we find some guidance in writings of the philosopher Stanley Cavell and the historian Richard Taruskin. I am going to lean rather heavily on some remarks by Cavell and Taruskin later on, so let me put them into evidence right away.

In his 1967 essay "Music Discomposed," Cavell speculates as to why the development of the twelve-tone technique was accompanied by the appearance of professional journals (*Die Reihe* and *Perspectives of New Music* in particular) devoted to its explanation and, apparently, its justification: why does the composer write this pitch here, or that rhythm there? The implication seemed to be that the answers to such questions were to be provided by the theoretical accounts in the journals—perhaps even that the theoretical discourse was a prop without which the music could not be properly understood. Cavell contends that "the periodicals about music . . . were trying to do what only the art of music itself could do" (1967, p. 207). Rather, a compositional technique can be justified only by its audible results, that is, by how the resulting music sounds.

8. Roger Scruton (1997) also criticizes serial music on *inter alia* the ground that its structure cannot always be heard. However, he explains the defectiveness of the idiom in part in terms of the expression of negative emotions and the disintegration of a traditional social order. Since I am moving in a very different direction, I will not address his views here. I should note that Scruton rejects generative grammatical approaches to musical understanding of the sort I will recommend here.

What is distinctive about twelve-tone music, according to Cavell, is that it forces to the surface something that holds for all art, viz., the possibility of fraudulence. Serialism's employment of highly constrained "mathematical" rules of composition opens up the possibility of music created entirely *by rules*; in other words, it opens up the possibility of music whose composition has not been determined by how it sounds. In such a case the composer cannot *mean* what he writes; he writes in bad faith, as one might say. Cavell explains:

The problem . . . is . . . one of . . . determining how a man could be inspired to do *this*, why he feels *this* necessary or satisfactory, how he can *mean* this. Suppose you conclude he cannot. Then that will mean . . . that you conclude that this is not art, and this man is not an artist; that in failing to mean what he's done, he is fraudulent. But how do you know? (203). . . [W]e can no longer be sure that any artist is sincere—we haven't convention or technique or appeal to go on any longer: *anyone* could fake it. And this means that modern art, if and where it exists, *forces* the issue of sincerity, depriving the artist and his audience of every measure except absolute attention to one's experience and absolute honesty in expressing it. (op.cit., p. 211)

Cavell is not so much criticizing twelve-tone music as raising a worry about it and using it to reveal a fact about art in general. Taruskin, on the other hand, is out for blood in this scathing review of Martino (1996):

Milton Babbitt tried to laugh the audience's claims on 20<sup>th</sup>-century music right out of court. "Imagine a layman chancing upon a [mathematics] lecture on 'Pointwise Periodic Homeomorphisms,' he wrote. At the conclusion, he announces, 'I didn't like it.'" Leaving the snobbery to one side, the analogy did make a philosophical point worth pondering. . . . But now imagine that one engaged Claire Bloom to read "Pointwise Periodic Homeomorphisms" with all the expressive resources of voice and gesture she would bring to the role of Ophelia or Desdemona. Her performance would add nothing to the paper so far as the math professors were concerned. The "layman" would find something to admire in the beauty of her rendition (as anyone listening to Mr. Holtzman's performance of Mr. Martino's compositions . . . will surely admire his sterling qualities of touch, timing, and tone). . . . And yet the lack of connection between the content of the utterance and the manner of its delivery would be a constant irritant both for the professors and for the layman. Both would find the performance somehow silly and gratuitous, though their reasons would vary.

That is the problem with Mr. Martino's piano music . . . Because there is no structural connection between the expressive gestures and the 12-tone-harmonic language, the gestures are not supported by the musical content (the way they are in Schumann, for example, music Martino professes to admire and emulate). And while the persistent academic claim is that music like Martino's is too complex and advanced for lay listeners to comprehend, in fact the expressive gestures, unsupported by the music's syntax or seman-

tics, are primitive and simplistic in the extreme. . . . The combination of gross expressive gestures for the layman and arcane pitch relationships for the math professors . . . fatally undermines the esthetic integrity of the music.

I think Cavell and Taruskin have put their respective fingers on some deep truths about twelve-tone music. Neither author explicitly mentions the fact that listeners cannot hear dodecaphonic structure, but as I will show, that fact both explains and justifies what they say.

## II

So far I have been taking for granted that listeners cannot hear twelve-tone structures, but of course this is an empirical matter that will need to be confirmed. The psychological data currently available are suggestive, though significantly qualified. I am going to describe a few important studies, but since our primary interest here is philosophical, I will highlight their conclusions without going into much detail about the experiments. The interested reader will want to consult the references at the end of this article.

Pedersen (1975) has tested the perception of octave equivalence in twelve-tone rows.<sup>9</sup> He presented subjects with pairs of rows in a so-called neutral context; that is, the rows consisted of isochronous tones presented apart from any musical setting. In each pair, the second row was either identical to the first (i.e., contained the same pitches in the same order) or different from it by having the order of two consecutive pitches reversed. (The same standard row, i.e., the first row in each pair, was used throughout the experiment, though in different permutations.) Pedersen found that subjects appeared to do well at discriminating between “same” and “different” pairs; in other words, they did well at identifying particular twelve-tone rows. However, they were almost entirely unable to perform the same task when the pitches in the rows underwent random octave displacement, that is, when the pitches were randomly displaced into different octaves. Pedersen concludes: “Both composers and theorists should be aware that serial technique is primarily a compositional working method and does not guarantee perceptual coherence to a musical work” (1975, p. 7).

Krumhansl, Sandell, and Sergeant later speculated (1987) that differences in contour (i.e., up or down motion in pitch) between the standard and comparison rows in Pedersen’s “different” pairs, rather than memory for the specific order of the pitches in either row, had enabled his listeners to discriminate between them. Krumhansl and her colleagues employed the so-called *probe tone* method to study subjects’ perception of the twelve-tone rows from two Schoenberg works.<sup>10</sup> In each trial an excerpt of one of the rows was presented, followed by a short silence, and then a single (probe) tone. The subjects’ task was to “rate how well the probe tone

9. Diana Deutsch (1972) had already shown that octave equivalence is not perceptually real in tonal melodies.

10. The Wind Quintet (1924) and the String Quartet No. 4 (1936). The probe tone method was introduced in Krumhansl and Shepard (1979).

fit with the preceding [excerpt] in the musical sense of the atonal idiom" (1987, p. 37). Briefly, the results suggested that subjects were not able to learn the specific order of pitches in a twelve-tone row, even after extensive exposure.<sup>11</sup> Also, it is worth noting that whereas Pedersen's subjects had included no trained musicians (all were undergraduates majoring in music education), the subjects in Krumhansl's study were all familiar with the twelve-tone or other atonal styles and included several graduate students in music.

On the other hand, Krumhansl did find that some highly experienced listeners were able to apprehend other aspects of twelve-tone structure. In particular, these subjects performed well at recognizing violations of the "constant circulation" rule, suggesting that they did "take serial order into account in a very general way in forming their judgments" (1987, p. 73). In addition, they produced highly consistent ratings with respect to excerpts from the same work (same row) as contrasted with excerpts from the two different works (different rows), and, in a classification task, were able reliably to categorize the prime form of a given row together with its inversion, retrograde, and retrograde inversion. (Subjects did not distinguish among the latter permutations but rather were able to recognize the permutations *as* permutations of one row rather than the other.) Subjects also produced lower probe tone ratings for pitches that "fit well" with local key implications (*viz.*, the occasional twelve-tone pitch configurations that happen to be coextensive with tonal patterns) than for pitches that didn't fit well with those implied tonal structures. Interestingly, Krumhansl's subjects performed equally well whether the excerpts were presented "neutrally" or in a musical context (*i.e.*, in the context of the actual Schoenberg pieces). She concludes that "these listeners perceived the structure of the row as invariant despite a wide variety of transformations including the reversal of temporal order, pitch direction, and the application of both these operations" (1987, p. 74).

These positive findings must be taken very seriously. At the same time, Krumhansl and her colleagues acknowledge the limitations of their study:

[T]he experiments were biased in favor of obtaining positive results. Very simple materials and tasks were employed, and listeners were provided by the experiments with extensive experience with a restricted set of sequences . . . [Also], not all of the effects based on 12-tone theory were obtained for any of the listeners, even listeners who showed other effects consistent with the theory. . . . [Results concerning] tonal implications as they were reflected in the probe tone ratings . . . could be taken to mean that listeners have succeeded in freeing the tones from tonal associations, permitting a new organization to emerge . . . On second consideration, however, the result suggests a strategy, whether conscious or not, of relating the serial contexts to tonal hierarchies of major and minor keys, and simply reversing the ordering of the ratings. In fact, a few listeners commented on having used this kind of response rule (1987, pp. 72–74).

11. There have been a number of studies showing that atonal pitch sequences are harder to learn than tonal ones. See, *e.g.*, Cuddy et al. (1981); Bharucha and Krumhansl (1983).

In addition, given Krumhansl's finding that listeners apparently do not learn the specific ordering of pitches in a twelve-tone row, it is not yet clear just what invariants they *are* abstracting from the music. If they do not learn the specific order of the prime form of a row, how are they recognizing permutations (inversion, retrograde, etc.) of the prime form as such? Here one wonders whether the fact that only two rows were used in this study made the various tasks artificially easy.

I want to mention also some experiments designed to test Allen Forte's well-known theory of the pitch structure of atonal (not necessarily twelve-tone) music. While the structures Forte discusses differ from those specified by Schoenberg, they equally avoid any implication of tonal center. Hence as far as the psychology of perception is concerned, the results of these experiments are likely to be informative.

Gibson (1985) tested 198 subjects, of whom 173 were university music students or faculty; 63 of the latter group were experienced with the atonal idiom. Each trial consisted of the presentation of two pairs of chords, in which the members of one pair were highly similar in pitch content according to Forte's analysis, while the members of the other pair were highly different (indeed, complementary). The subjects' task on each trial was to say "which pair sounds more different." Gibson discovered that even his expert listeners were unable to perform this task. (Also, contrary to what Krumhansl and her colleagues found, Gibson's subjects did less well when stimuli were presented in a musical context than when they were presented neutrally.) He concludes: "[these] results . . . strongly suggest that the relationships presented in this experiment do not present the aural correlate of their theoretical associations to listeners" (1985, p. 21). In a subsequent paper reporting similar results from another experiment (1993), Gibson writes that the "overall evidence suggested that neither maximum pc similarity (pc set identity) nor maximum pc dissimilarity (literal complementation) was capable of projecting its aural correlate to auditors. . . . [I]t seems clear that theoretical speculation is not always reflected in aural experience" (1993, p. 23).<sup>12</sup>

These are just a few of the studies that have been done, and one could of course say a great deal more about them. What is clear, however, is that while the jury is still out on the question of the perceptual reality of twelve-tone and other atonal structures, there is sufficient negative evidence to give the charge of unreality serious bite. With that in mind, I will make my question conditional: supposing that twelve-tone structure is not perceptually real, that is, supposing that listeners cannot hear twelve-tone structure, is twelve-tone music artistically defective? If so, why?

### III

The answers I want to give to these questions become available in the context of an account of the meaning and understanding of tonal music that I have developed in some previous work (1991, 1993). I will not review that account in detail here, but I need to set out its central ideas.

12. "Pc" stands for "pitch-class."

I take as my starting point the familiar thought that, like all art, music is a form of expression or communication; hence at least one result of hearing a piece of music is some form of understanding. As Cavell explains, “The first fact of works of art is that they are meant, meant to be understood” (op.cit., p. 123). But what exactly does our understanding of music consist in? Understanding is grasp of meaning, but what is musical meaning? Many scholars deny the existence of musical meaning; for example, Peter Kivy writes that “although musical meaning may exist as a theory, it does not exist as a reality of listening. . . . [I]t seems wonderful to me, and mysterious, that people sit for protracted periods of time doing nothing but listening to meaningless—yes, meaningless—strings of sounds” (1990, p. 12). Kivy is right, of course, with respect to anything resembling a referential semantics for music. Indeed much of the resistance to the idea of musical meaning owes to forced, implausible analogies between music and language. However, there are other, subtler analogies between the two domains, and once we recognize these, a promising picture of musical meaning emerges. Specifically, I propose that musical understanding, grasp of musical meaning, consists in experiencing certain peculiarly musical feelings. Let me explain.

Roughly, on a standard (traditional Chomskyan) picture, a competent listener understands an utterance of a natural language by unconsciously applying grammatical rules to (a mental representation of) the incoming acoustic string. These rules analyze the phonological, syntactic, lexical, and semantic structure of the utterance. Chiefly relevant to our concerns about music is the syntactic component of the linguistic grammar, which generates a *structural description*, a kind of tree analysis, of the utterance. The structural description represents the fact that a certain word is the subject of the uttered sentence, that another modifies the verb, that a certain pronoun is linked anaphorically to a preceding noun, and so forth. In essence, the structural description effects a mapping from a phonological representation of an acoustic stimulus to a semantic representation, where the semantic representation constitutes the listener’s understanding or grasp of meaning.

Not coincidentally, a similar view has been advanced with respect to tonal music. Lerdahl and linguist Ray Jackendoff (1983) propose that the experienced listener understands a musical utterance (a performance of a given work) by unconsciously applying musical grammatical rules to (a mental representation of) the incoming acoustic string.<sup>13</sup> For present purposes we will not go astray if we think of the musical grammar as relevantly analogous to the syntactic component of the linguistic grammar; in particular, the musical rules include nothing corresponding to a semantic component. The structural description represents *inter alia* local pitch and rhythmic structure and at least some of the architectural structures mentioned above.<sup>14</sup> On the Lerdahl-Jackendoff model, it is primarily in virtue of assigning a structural description that we hear the events in the acoustic stimulus

13. By “experienced listener” Lerdahl and Jackendoff mean a normal human listener familiar with, but not necessarily trained in, the tonal idiom.

14. There is an interesting question as to how much architectural structure is perceived by listeners; see Lerdahl and Jackendoff (1993), pp. 188–191, and Raffman (1993), p. 152, n.30, for some discussion.

as melodies and harmonies and cadences, that we hear one chord as more stable than another, that we hear phrase endings where we do, that we hear points of tension and resolution, that we recognize wrong notes, and so forth. In other words, it's because we assign a structural description to the music that we hear it *as music* rather than as a string of more or less undifferentiated sounds. As Lerdahl and Jackendoff put it, the structural description is what underlies our peculiarly musical *feelings* of tension, resolution, stability, rhythmic stress, and the rest.

The view of linguistic understanding sketched above yields an attractive picture of linguistic communication. The thought is that communication is made possible because the listener's unconscious grammar reproduces in his mind the same representations that occurred in the speaker's mind and that caused the speaker to produce the sounds he did. Jerry Fodor explains:

Verbal communication is possible because, when [an acoustic object] U is a token of a linguistic type in a language [both speaker and hearer] understand, the production/perception of U can effect a certain kind of correspondence between the mental states of the speaker and the hearer. . . . It may be worth emphasizing that this sort of account has a quite natural interpretation as a *causal* theory of communication. . . . [O]ne might say [that] a necessary and sufficient condition for communication between speaker and hearer is that the mental states of the one should be in the right sort of causal relation to the mental states of the other. (1975, pp. 103–104)

On the Lerdahl-Jackendoff theory of music perception, a similar story seems plausible. To simplify, suppose a composer performs her own music at the keyboard. The idea is that the mental representations of musical structures (harmonies, melodies, downbeats, phrases, transitions, recapitulations, etc.) that occur in the composer's mind, and that cause her to produce the sounds she does, are reproduced in the mind of the listener. This causal process includes the production, perception, and structural description of an acoustic object. *In rerum naturae*, of course, the causal chain will be somewhat more complex—but only more complex—involving the production and perception of graphic marks, the behavior of a distinct performer, and so forth.<sup>15</sup>

15. The following remarks by Collingwood are prescient, and wonderfully suggestive, in this regard:

The noises made by the performers, and heard by the audience, are not the music at all; they are only means by which the audience . . . can reconstruct for themselves the imaginary tune that existed in the composer's head. . . . [T]he listening which we have to do when we hear the noises made by the musicians is in a way rather like the thinking we have to do when we hear the noises made, for example, by a person lecturing on a scientific subject. We hear the sound of his voice; but what he is doing is not simply to make noises, but to develop a scientific thesis. The noises are meant to assist us in achieving what he assumes to be our purpose in coming to hear him lecture, that is, thinking the same scientific thesis for ourselves. . . . [W]e must think of communication not as an "imparting" of thought by the speaker to the hearer, the speaker somehow planting his thought in the hearer's receptive mind, but as a "reproduction" of the speaker's thought by the hearer, in virtue of his own active thinking. (1938, p. 140)

The result of the unconscious assignment of a structural description to a verbal acoustic stimulus is understanding, grasp of the meaning of the utterance; indeed, understanding is presumably the point, not just the result, of the grammatical analysis. It is also the point of the speaker's production of the acoustic stimulus. Here, understanding or grasp of meaning consists (at least in part) in knowing what the sounds refer to, what they assert about the world. Compare now the case of tonal music: what is the result, and the point, of the unconscious assignment of a structural description to a musical acoustic stimulus? Well, the having of a certain form of experience—specifically, experience of the peculiarly musical feelings we have been discussing, viz., feelings of tension, stability, rhythmic stress, resolution, and the like. In contrast to a linguistic semantics, these feelings result immediately from the listener's recovery of musical structure, without the mediation of rules. (There is, for example, no need for a rule such as "When you represent a given event as a resolution, have a feeling of stability". We are presumably just wired to feel that way.) I contend that understanding a particular piece of music, grasping its meaning, consists in undergoing a particular sequence of these feelings. This kind of experience is what we value in listening to music, what we find aesthetically interesting in it, and what musical composition is meant to communicate: the point of writing music is to bring about in a listener the same sequence of feeling experiences that occurs in the composer when she creates (unconsciously mentally represents) the music. In the case of tonal music, what enables this reproduction of feelings in the listener is his recovery of the music's (local and architectural) structure.<sup>16</sup>

Ideally, of course, one would elaborate in detail the character of these musical feelings; one would say more to delimit the class of them and explain how they differ from stereotypical emotions like anger and fear among other things. For present purposes, though, I think no serious trouble will arise if we take as understood the existence and nature of feelings *of a kind* with the feelings of musical tension, stability, resolution, rhythmic stress, and so forth, to which Lerdahl and Jackendoff refer. For convenience I will call these feelings, simply, "musical feelings". I will assume that there are such feeling experiences, that any experienced listener is familiar with them, and that they occur uniquely in response to music. Whether they occur uniquely in response to *tonal* music is a question we are so far leaving open.

Given the nature of my project here, it doesn't matter whether the details of these linguistic- and music-grammatical views are correct. What matters is only the idea, apparently applicable in both cases, that grasp of meaning requires recovery of formal structure. Also, I do not mean to suggest that linguistic and musical understanding thus characterized are exhaustive of those phenomena: there are doubtless more kinds of linguistic and musical meaning than are captured by a referential semantics or a musical feeling semantics of the sort I have been recommending. (Pragmatic and emotive meanings come to mind, just for example.) We

16. Lerdahl and Jackendoff identify understanding with the assignment of a structural description, but as I noted in 1993 (p. 49) this cannot be right. Rather, the assignment of a structural description results in musical understanding (feeling).

might call the species of understanding at issue here the *literal* understanding, or grasp of the *literal* meaning, of a linguistic or musical utterance. It is the kind of understanding I have in mind when I say that I don't understand Chinese—and, I'll suggest, when I say that I don't understand twelve-tone music.

The analogy between tonal music and language goes further. If musical meaning consists in musical feelings, then musical understanding, like the understanding of language, is creative in Chomsky's sense. Just as the competent speaker-hearer can understand indefinitely many novel linguistic utterances simply upon hearing them, the experienced listener can understand (i.e., have the relevant feelings in response to) indefinitely many novel musical utterances simply upon hearing them. Compare the kind of musical understanding one has of, say, a Wagnerian *leitmotiv*: in order to understand the meaning of the *leitmotiv*, we need to be told which character it signifies. The fact that a certain *leitmotiv* refers to a certain character is an element of the meaning of the opera, but not an element that we understand simply in virtue of our competence with tonal music. In contrast, no program notes or other ancillary information is required to feel an authentic cadence as arriving at a point of stability, or the downbeat as a point of metrical stress.

I want to mention briefly one other feature of the musical feelings that tends to support an analogy to linguistic meanings—their normativity: we can be right or wrong in having them. *Ceteris paribus* if I feel an authentic cadence as increasing in tension, or an upbeat as a point of metrical stress, I am mistaken. On the view endorsed here, to hear, for example, a downbeat *as a downbeat* just is to feel it as a point of metrical stress; therefore, since one can be wrong in hearing an event (say, an upbeat) as a downbeat, one can be wrong in feeling an event as a point of metrical stress. By the same token, the student who fails to play a downbeat as metrically stressed (suppose he stresses the upbeat instead) will be corrected by his teachers.

These are not the only parallels between linguistic and musical understanding, but I think they are enough to make plausible the idea that the literal understanding of tonal music consists in the experiencing of certain peculiarly musical feelings. This species of understanding is made possible by the recovery of local and architectural tonal structure. How then does this view bear on the case of twelve-tone music? Does an analogous account apply, given that twelve-tone structure is not perceptually real?

#### IV

It seems to me that twelve-tone music must satisfy at least two aspects of the preceding account. First, it must be *au fond* a form of communication between composer (and performer) and listener. Second, its literal understanding, the point of writing and listening to it, must be the having of a certain type of musical feeling experience. I think this pair of claims is true of all music, and so is true of dodecaphonic music. One might have thought that the point of listening to twelve-tone music was to have a purely intellectual (“mathematical”) experience; but we have it on the highest authority that feeling plays a crucial role. Schoenberg writes:

Form in the arts, and especially in music, aims primarily at comprehensibility. The relaxation which a satisfied listener experiences when he can follow an idea, its development, and the reasons for such development is closely related, psychologically speaking, to a feeling of beauty. Thus, artistic value demands comprehensibility, not only for intellectual, but also for emotional satisfaction. . . . Composition with twelve tones has no other aim than comprehensibility. (1975/1941, p. 215)

Even Pierre Boulez, arch champion of serialism, seems to allow an essential role for feeling in the perception of his music: “[e]very musician who has not felt—we do not say understood, but indeed felt—the necessity of the Serial language is USELESS” (1952).<sup>17</sup>

Obviously we cannot assume that the musical feelings (“emotions”) at issue are just the sort caused by perception of *tonal* music. Rather, we must allow for the possibility that some analogous but distinct form of musical feeling constitutes the literal meaning of twelve-tone music. For example, we assume that there is no feeling of tonal center, and perhaps no feeling of stability, in the perception of a twelve-tone work; but feelings of tension and resolution may abound. More to the point, it is an open (and empirical) question just which features of a musical idiom are the ones that afford the sort of feeling experience in question—that is, which features are the meaningful ones. (Cavell says: “It is a problem, an artistic problem—an experimental problem, one could say—to discover what will have the capacity to absorb us the way art does” [1967, p. 197].) I have argued that understanding a tonal work requires recovering its structure. On the other hand, we are supposing that listeners do not grasp twelve-tone structure. Does this pose a problem? In particular, can the literal understanding of a twelve-tone work result from recovery of some property or properties other than its twelve-tone structure? Let us consider what these might be.

Here Schoenberg’s remarks about the role of local harmony (pp. 70–71 above) may provide some direction. As I said before, he appears to distinguish between relatively large-scale architectural structures such as endings, transitions, codettas, recapitulations, and movements, on the one hand, and local structures such as chord-to-chord harmonic and note-to-note melodic progressions, on the other. If I understand the twelve-tone theory properly, its definitive constraints apply primarily at the level of local structure; if twelve-tone pitch structure is not perceptually real, this means that local pitch structure in a twelve-tone work is not perceptually real. But what about the architectural structures? They are not specifically *serial* in nature: tonal works equally contain endings, transitions, codettas, and the rest. Furthermore, anecdotal evidence suggests that trained listeners are often able to recognize these large-scale structures in a twelve-tone piece; in any case, let us suppose that they are perceptually real. Could the feeling experiences caused by perception of architectural structures, unaccompanied by perception of local (twelve-tone) structures, constitute the meaning of a dodecaphonic work? I will return to this question shortly.

17. Cited in Schwarz (1997).

I think Schoenberg is also implicitly invoking a second distinction, between structural and what I have elsewhere (1993) called *nonstructural* features of music. Very roughly, in tonal music the nonstructural features are not recovered according to grammatical rules; and so they do not figure in our structural description of the music. (They are not *notated* in the score, in Goodman's sense.<sup>18</sup>) Rather, they are dimensions of the stimulus—dynamics, tempo, and timbre are prime examples—that are controlled and varied by the performer in order to guide the listener to the structurally important events. In other words, they are expressive features that the performer controls in leading the listener to generate a “maximally coherent” structural description—an *interpretation*—of the work. If the performer wants to indicate a phrase ending, he may slow the tempo slightly or raise the dynamic level; to increase the tension, he may darken his tone quality or make the articulation crisper; and so forth. In this way, the nonstructural features are subservient to the structural ones. As I say, this is how the nonstructural features function in tonal music; whether they play the same role in twelve-tone music remains to be seen. What is clear, however, is that like the architectural structural features, the nonstructural features of a twelve-tone piece are not specifically serial, and they are perceptually real.

The question then is this: could the feeling experiences engendered by either or both of these two kinds of musical features—architectural and nonstructural—constitute the meaning of a twelve-tone work, as Schoenberg might suggest? Does perception of these features give rise to the relevant sorts of feelings?

Consider again the case of tonal music. It seems obvious to me that we do not listen to tonal music because we are interested in expositions, recapitulations, phrases, or movements *per se*; our purpose in listening to tonal music is not to hear those architectural structures. Rather, the focus of our interest (in pitch, anyway) seems to be the local harmonic and melodic events in a piece.<sup>19</sup> Or, perhaps better, we find the architectural structure of the music interesting *only* in the presence of perceptually real local structure. I contended above, in discussing Schoenberg's remarks, that local harmonic structure was not “comparable to punctuation,” that it was comparable rather to story line. The idea that we should find the architectural structures of a tonal work interesting apart from its local structure is no more plausible than the idea that we should find a book's organization into sentences, paragraphs, chapters, and so forth interesting apart from a story line. The trouble in both cases, I suggest, is that no feelings of the relevant kind would be engendered. One might put the point by saying that the structure of sentences and paragraphs and chapters *per se*, and the structure of phrases and sections and movements *per se*, are of no *aesthetic* interest. Or at any rate they are of no literary or musical interest, respectively.

18. See Goodman (1975), pp. 183–184; and my 1993, pp. 100–109. One *might* argue that the nonstructural features do not enter into the identity conditions of the work, but the issue is controversial and must be set aside here.

19. Indeed, architectural structures are often more or less conventional in tonal music of a given style; they may become *standard* features in Kendall Walton's sense and recede from auditory prominence as a result. See Walton (1971), p. 339.

While I don't know how to prove this, it seems incredible that the situation should be radically different in twelve-tone music—viz., that perception of architectural structure should be meaningful independently of the perception of local harmony. Surely, if the architectural features did play such a focal role, we would find twelve-tone works interesting, would seek them out, despite the perceptual unreality of their local (twelve-tone) structure. But as a matter of fact we don't: serialism has never really found an audience, and even trained listeners today are largely uninterested in it except as an object of theoretical or historical scholarship. At the least, significant argument would be required to show that architectural structure takes on an independent, focal role in twelve-tone music. I don't deny that musical feelings engendered by architectural structures could be elements of the meaning of a twelve-tone work *in the presence of* perceptually real local structure. But by themselves the architectural structures are unlikely to afford the sort of feeling experience that interests us in music and provides its meaning.

A similar difficulty appears to face the nonstructural features. Again, consider the case of tonal music. As I observed above, the role of nonstructural features is to guide the listener's ear to the (local and architectural) structure of the work. In tonal music, the nonstructural features are by their nature subservient to structure: their primary purpose is to communicate the performer's interpretation, his structural description, of the work. This suggests that in tonal music, the nonstructural features would be meaningless, their perception would fail to cause musical feelings, in the absence of perception of structure. What if anything follows about perception of the nonstructural features in twelve-tone music, where architectural structure but not local structure is perceptually real? Could perception of the nonstructural features engender musical feelings, given perception of architectural structure only? It is hard to see how, if, as I have suggested, the architectural structures are not themselves meaningful apart from local structure.

Alternatively, could perception of the nonstructural features of a twelve-tone work be meaningful independently of the perception of structure altogether? Again it is hard to see how, unless the nonstructural features function very differently in twelve-tone music than in tonal music. It is possible that these features are subservient to structure only in tonal music, and that in twelve-tone music they somehow take on an independent, focal role; but such a state of affairs seems unlikely and in any case does not appear to obtain in fact. As before, if the nonstructural features were independently meaningful, listeners would presumably find twelve-tone music interesting despite the perceptual unreality of twelve-tone structure. I do not deny that feelings caused by nonstructural features could be an element of the meaning of a dodecaphonic work—but only in the presence of perceptually real local pitch structure.

In this connection Taruskin's insight shines through. He says:

Because there is no structural connection between the expressive gestures [e.g., of touch, timing, and tone] and the twelve-tone harmonic language, the gestures are not supported by the musical content. . . . [T]he expressive gestures, unsupported by the music's syntax or semantics, are primitive and sim-

plistic in the extreme. . . . The combination of gross expressive gestures for the layman and arcane pitch relationships for the math professors . . . fatally undermines the esthetic integrity of the music.

In Taruskin's example, the expressive details of Claire Bloom's performance of the mathematics lecture would be at best superfluous. Similarly, in twelve-tone music, the performer's expressive gestures (nonstructural features) seem pointless. They have no role to play, and so they come off as so much empty musical mugging. If the expressive gestures have no role to play, then the performer has no role to play. As a result, the twelve-tone composer finds himself alienated not only from his listener but from his performer as well.

## V

If what I have been saying is right, the two kinds of musical features just examined (architectural and nonstructural) suffer from the same problem: they fail to engender musical feeling experiences in the absence of perceptually real local pitch structure. Of course, it is possible that feeling experiences afforded by still other features of twelve-tone music, not considered here, constitute its meaning. For example, I have been speaking only about pitch, but perhaps the rhythmic and durational aspects of a twelve-tone work are perceptually real and give rise to musical feelings of the relevant sort. Nevertheless, I think our discussion thus far places the burden squarely on the defender of serialism to show that this is so.

That said, even if there *are* other features of twelve-tone music whose perception engenders musical feelings, the perceptual unreality of twelve-tone pitch structure constitutes a critical defect. The reason why has to do with an important intentional property of twelve-tone music that I have not yet made explicit: it *purports* to contain meaningful pitch structure. In other words, it purports to afford musical feeling experiences as a result of perception of its serial pitch structure. To see this, consider that, for example, Rap music has no pitch structure at all; so presumably it too cannot engender the sort of pitch-related musical feeling experiences we have been talking about. Does this mean it is defective? No, because Rap music does not purport to afford such feelings; it does not purport to carry *any* pitch-related musical meaning. (Perhaps the meaning of Rap music consists in musical feelings engendered by perception of its rhythmic and durational structure, for example.) Rap is atonal in a "presupposition-canceling" way: it has no pitch. ("Nontonal" is probably a better term for Rap.) Dodecaphonic music, on the other hand, is atonal in a "presupposition-preserving" way: it has pitch, indeed is richly structured in pitch, but is not tonal. Because of its rich (and designed) pitch structure, twelve-tone music purports to afford pitch-related musical feelings. However, given the perceptual unreality of that structure, the result is that twelve-tone music purports to engender feelings that it cannot engender. Picturesquely speaking, twelve-tone music demands from the listener a response to which it is not entitled.

To characterize the difference another way, Rap music does not have a (*prima facie* essential) pitch structure—or, for that matter, any kind of structure—

that is aurally inaccessible to human beings. *This* is the defect in twelve-tone music—a structure that makes it at once purport to afford, and fail to afford, a certain type of pitch-related feeling experience. Twelve-tone music purports to mean something it cannot mean. I don't deny that dodecaphonic music is comprehensible “intellectually,” that is, theoretically; rather, it is incomprehensible “emotionally,” that is, experientially. It's not that we cannot understand such music *at all*, but rather that we cannot understand it in the right way—viz., by hearing or feeling. As Cavell notes: “the first fact about art [is] that it must be felt, not merely known” (1967, p. 114).

Cage's *4'23"* provides an illuminating contrast. Here is a work with, for all intents and purposes, no perceptually real structure (pitch or otherwise), hence no possibility of engendering any musical feelings. But of course it does not purport to engender such feelings, and so its lack of perceivable structure is no defect. Indeed, its lack of perceivable structure is essential to its meaning, for it is a work of philosophy, not (musical) art.

If twelve-tone pitch structure is not perceptually real, if twelve-tone music cannot carry the pitch-related meaning it purports to carry, then it cannot be a vehicle for the communication of such meaning. Therefore I claim, in virtue of human psychological design, a composer cannot intend to communicate pitch-related musical meaning by writing twelve-tone music. As Cavell would put it: the twelve-tone composer cannot *mean* what she writes; she cannot mean it *as music*. To that extent, twelve-tone music is fraudulent, and so not art. More precisely, twelve-tone music is art to a lesser degree than the music of, say, Bach or Brahms.<sup>20</sup> (Apparently the word “art” is vague.) Saying to oneself, “I intend these sounds to communicate pitch-related musical feeling experiences” does not mean that one intends them so to communicate, any more than saying to oneself, “I am imagining that water is not H<sub>2</sub>O” makes it the case that one so imagines. There are limits on what one can imagine and similarly limits on what one can intend. Of course, if it turns out that no other features of twelve-tone music (e.g., rhythmic features) can afford musical feeling experiences of the requisite kind—we are leaving open this possibility—then the idiom is not art at all.

## REFERENCES

- Bharucha, J. J. and C. L. Krumhansl. 1983. “The Representation of Harmonic Structure in Music: Hierarchies of Stability as a Function of Context.” *Cognition* 13:63–102.
- Boulez, P. 1963. *Penser la Musique aujourd'hui*. (Mainz: Schott) Translated by S. Bradshaw and R. Bennett, Cambridge: Harvard University Press, 1971.
- Brindle, R. S. 1966. *Serial Composition*. London: Oxford University Press.
- Cavell, S. 1967. “Music Discomposed”. In W. H. Capitan and D. D. Merrill (eds.), *Art, Mind, and Religion*. Pittsburgh: University of Pittsburgh Press.
- Collingwood, R. G. 1938. *The Principles of Art*. Oxford: Oxford University Press.

20. For analogous reasons, a work consisting of one or more English sentences, arguably well-formed and meaningful, but each containing too many center embeddings to be understood by a competent listener, could not be a work of literary art. It might of course be an artwork of some other kind, or a conceptual work.

- Cuddy, L. L., A. J. Cohen, and D. J. K. Mewhort. 1981. "Perception of Structure in Short Melodic Sequences." *Journal of Experimental Psychology: Human Perception and Performance* 7: 869–83.
- Deutsch, D. 1972. "Octave Generalization and Tune Recognition." *Perception and Psychophysics* 11(6):411–12.
- Gibson, D. 1986. "The Aural Perception of Nontraditional Chords in Selected Theoretical Relationships: A Computer-Generated Experiment." *Journal of Research in Music Education* 34(1): 5–23.
- Gibson, D. 1993. "The Effects of Pitch and Pitch-Class Content on the Aural Perception of Dissimilarity in Complementary Hexachords." *Psychomusicology* 12:58–72.
- Gibson, D. 1995. "Theoretical Assumptions and Aural Experiences in the Pitch-Class Set Domain." *Music Theory Explorations and Applications* 4:17–25.
- Goodman, N. 1968. *Languages of Art*. Indianapolis: Bobbs-Merrill.
- Kivy, P. 1990. *Music Alone*. Ithaca, NY: Cornell University Press.
- Koblyakov, L. 1977. "P. Boulez, 'Le Marteau Sans Maitre,' Analysis of Pitch Structure." *Zeitschrift für Musiktheorie* 8(1):24–39.
- Krumhansl, C. L. 1990. *Cognitive Foundations of Musical Pitch*. New York: Oxford University Press.
- Krumhansl, C. L. and R. Shepard. 1979. "Quantification of the Hierarchy of Tonal Functions within a Diatonic Context." *Journal of Experimental Psychology: Human Perception and Performance* 5:579–94.
- Krumhansl, C. L., G. J. Sandell, and D. C. Sergeant. 1987. "The Perception of Tone Hierarchies and Mirror Forms in Twelve-Tone Serial Music." *Music Perception* 5(1):31–78.
- Lerdahl, F. 1988. "Cognitive Constraints on Compositional Systems". In J. Sloboda (ed.), *Generative Processes in Music*. Oxford: Oxford University Press, pp. 231–59.
- Pedersen, P. 1975. "The Perception of Octave Equivalence in Twelve-Tone Rows." *Psychology of Music* 3:3–8.
- Raffman, D. 1983. *Language, Music, and Mind*. Cambridge: MIT Press/Bradford Books.
- Raffman, D. 1991. "The Meaning of Music." *Midwest Studies in Philosophy: Philosophy and the Arts* 16:360–77.
- Schoenberg, A. 1975 (orig. 1941). "Composition with Twelve Tones (1)". In *Style and Idea*, Leo Stein (ed.). London: Faber & Faber, pp. 214–45.
- Schoenberg, A. 1975 (orig. 1948). "Composition with Twelve Tones (2)". In *Style and Idea* Leo Stein (ed.). London: Faber & Faber, pp. 245–49.
- Schwarz, K. R. 1997. "In Contemporary Music, A House Still Divided." *The New York Times*, August 3.
- Scruton, R. 1997. *The Aesthetics of Music*. Oxford: Oxford University Press.
- Taruskin, R. 1996. "How Talented Composers Become Useless." *The New York Times*, March 10.
- Walton, K. 1971. "Categories of Art." *Philosophical Review* 79(3):334–67.