Composing Notes

By Fred Lerdahl

Background

In my mid-twenties I experienced a prolonged creative block caused by the lack of a systematic compositional method. Beneath the block was a crisis of belief. Composers of earlier generations had belonged to aesthetic camps that provided the security of reasonably complete aesthetic worldviews. If you were in the neoclassic camp, you embraced an urbane use of the past, employing certain compositional techniques; if you were in the serialist camp, you embraced an idea of the future, employing other techniques. With the explosion of the postwar avant-garde, however, anything became permissible and therefore nothing had the stamp of authority.

I have always been attracted to systematic approaches to composition, but the compositional systems that were fashionable in the 1960s tended to be opaque to the informed listener when hearing music composed with them; one could not discern the methods of construction without concentrated study. I saw no reason to compose by a hidden code (see Lerdahl 1988). Moreover, the justification for these systems was at bottom merely historical: composer A influenced composer B, who influenced composer C, and so on. According to the prevailing neo-Hegelian ideology, each step was obligatory and pointed the way to future progress. A composer who took the next dialectical step was viewed as significant. If you were not on the wave of the future, you were irrelevant to those who believed in that particular wave. By the late 1960s, however, there were many competing waves, and they effectively cancelled each other out.

I wished to base my composing not on hidden codes and historical contingency but on the nature of the musical mind. By itself, this impulse was too vague to be useful. I began to see how it might lead to something substantial when I read Noam Chomsky's theory of generative linguistics, which advanced a program for the study of the human capacity for language. Chomsky's goal was to investigate particular grammars, the specifics of which are learned by experience, as a means toward characterizing universal grammar, which represents the computational mechanisms of the innate linguistic mental module and which underlies the learnability of particular grammars. This way of thinking about a mental capacity was revolutionary at the time, and it laid part of the foundation for what has since then become the cognitive sciences.

The postwar musical avant-garde had found its natural affinity in the behaviorist philosophy that was ascendant in the 1940s and 1950s.

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Behaviorists believed that the mind was initially an undifferentiated blank slate that was completely malleable, and that learning took place entirely by exposure and association. This view suited historically contingent music that employed arbitrary codes, for how else could anyone believe that such music was learnable?

I sensed in the Chomskian approach a fresh way to think about music. If it was possible to study the language capacity, it should also be possible to study the musical capacity. If this could be accomplished in any detail, it should then be feasible to use this knowledge to guide the development of compositional methods that are structurally rich yet cognitively transparent. Admittedly, this was a utopian quest conceived in broad strokes, but it provided a program for my own development.

This program began to materialize after I met Ray Jackendoff, a linguist who had independently reached similar conclusions about the application of the Chomskian framework to music. For years we worked closely together to develop a formal cognitive music theory, culminating in *A Generative Theory of Tonal Music* (1983; hereafter *GTTM*). We concentrated on the particular grammar of Classical tonal music, but our deeper goal was to articulate universal principles of musical cognition.

Starting with this collaboration, I divided my creative time between composition and theory, never mixing the two at any given time period because I needed to keep some distance between these very different activities. Although the theoretical work took on a life of its own, I never lost my initial motivation of pursuing theory for the purposes of composition. The influence, in fact, went both ways. Not only did theoretical ideas find an adapted place in my music, but my musical imagination and creative needs also suggested theoretical ideas, sometimes well in advance of anything I was able to state systematically. This interaction between composition and theory has persisted to the present day.

Compositional Syntaxes

While working with Jackendoff I did many reductional analyses of tonal pieces, some of which appeared in *GTTM,* in order to test and refine the rules that we were formulating. This activity led to the notion of composing by "expanding variations," which constituted a kind of reduction in reverse, spread over time. The idea was to begin with a single, stable event and elaborate it progressively into a few events, then more events, and eventually many events covering many minutes. As the events were elaborated, the complex would gradually become highly unstable. The materials themselves would not be the standard tonal ones but materials of my own devising.

To compose in this fashion held two major attractions. First, since the early 1970s I had felt the urge to recover tonality, broadly conceived, but

in a new way. I did not care for the grayness of the constant recycling of the total chromatic. I wanted to be able to write anything from a triad to a twelve-note chord in ways that would make aural sense, to have available the full range of the tension of sensory dissonance and the resolution of sensory consonance, and to locate a home base so that a phrase or section could depart from it and return again. I came to see tonality less as a stylistic principle than as a cognitive principle that it would be unfortunate not to engage.

Second, I sought novel formal procedures. The reconstituted neoclassical forms of Stravinsky and twelve-tone Schoenberg held little interest for me. More compelling—to take two contrasting examples—were the transformational motivic processes of late Sibelius and the simultaneous tempo unfoldings of Carter. (In this connection, I have never subscribed to the mainstream notion that equates modernity with degree of dissonance. Music is too multivalent for such simplicities. Twelve-tone Schoenberg was radical in pitch organization but retrospective in the treatment of motive and form; late Sibelius was conservative in pitch organization but forward-looking in the treatment of form and instrumentation. By now, the employment of microtonal dissonances and noise is quite familiar, so it is pointless to pretend to advance music by writing more dissonant sonorities. There are more interesting ways to be original.)

The composition of expanding variations satisfied both criteria, that of recovering tonality and that of working with a new formal procedure. It also provided a fruitful balance between order and freedom. This was important given the then recent atmosphere in which total serialism and chance had vied as putatively serious modes of compositional organization. In expanding variations, any given variation is elaborated within the structure of the previous variation, yet how it is elaborated is not predetermined. Once the variation is realized, it in turn sets the framework within which the next variation evolves. The result is an open-ended process within well-defined constraints.

I first employed this compositional procedure in my First String Quartet (1978). This piece also introduced in rather pure fashion a particular syntax to which I have often returned in various ways. As this syntax incorporates a number of principles related to my theoretical work, I shall briefly describe it here. Figure 1 gives the first six expanding variations of the Quartet, notated in reductional format without specific durations. The slurs represent prolongational relationships. Variation 1 states a completely stable sonority, low G with its immediately upper partials. Variation 2 adds the same sonority in slightly less stable form with D rather than G on top. Variation 3 interpolates a more dissonant chord comprised of the double leading-tones to G and D: A♭→G, F♯→G, E♭→D, and C♯→D.

In the latter case, the resolution of C♯ is displaced to G, outlining root motion in the bass and bisecting the octave. Variation 4 in turn elaborates the C♯ chord by a still more dissonant chord, created by whole-step motion in each of its voices: B♭→A♭, E→F♯, F→E♭, and B→C♯. Thus, the entire voice-leading is symmetrical around G and D. The chord progression is from consonance to high dissonance to intermediate dissonance to consonance: in pitch-class sets, (0 5)→(0 1 6 7)→(0 2 5 7)→(0 5). The T→S→D→T written beneath variation 4 represents harmonic function as described in my *Tonal Pitch Space* (2001; hereafter *TPS*). The progression is analogous to the standard T→S→D→T of diatonic tonality, in terms not of harmonic vocabulary but of equivalent prolongational position. This is the basic cadential (or closural) progression in this piece.

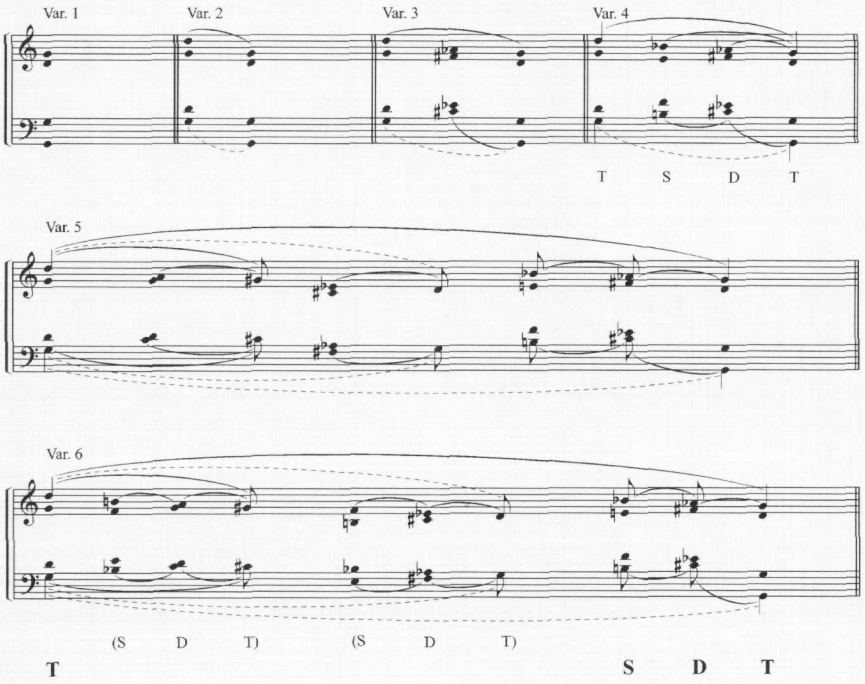
Variation 5 elaborates this structure by transposing D→T to C♯ with attendant voice-leading, and then by moving back to G but in the less stable form of resolving melodically to D on top; the cadential progression then follows as before. The transposition to C♯ parallels tonicizing the dominant in diatonic music: D-function becomes local T-function. Variation 6 fills out the progression by adding S-function chords, completing the T→S→D→T schema in a nested context.

In the actual piece, linear displacements and elaborations in individual voices have already begun to occur by this point, but the logic of the structure is as in Figure 1. As later variations expand, the texture becomes increasingly polyphonic and the harmonies increasingly dissonant through vertical elaboration. The tritone transposition in variations 5 and 6 soon becomes a full minor-third transpositional cycle. Subsections acquire their own motivic and expressive characters, like parts of a growing, differentiating organism. The (0 1 6 7) chord evolves into a scherzando section with octatonic passagework, the (0 2 5 7) chord into a mysteriously lyrical passage. The final cadence eventually dissipates into disjunct, noise-like sounds.

The idea of making a coherent harmonic syntax out of different chord types with varying degrees of dissonance came from an earlier, unpublished study (originally my unfinished doctoral dissertation) on the early music of Schoenberg. One thinks first of all of the opening progression of his Chamber Symphony, Op. 9, whose opening progression (fourth-chord→whole-tone chord→triad) governs so much of that piece's harmonic and motivic material. Equally suggestive was Schoenberg's Second Quartet, Op. 10, whose basic cadential motion is the double leading-tone structure, D→T, shown in fig. 1. One also finds this progression in Bartók and early Stravinsky.

Theory obviously influenced composition in the procedure shown in fig. 1, above all in the concept of expanding variations with its hierarchical

Figure 1: The first six expanding variations of the First String Quartet, notated in prolongational format.



elaborations. But composition also influenced theory, although at the time I had little inkling of it. First is the intuition of harmonic functions, defined by prolongational position. Second is the whole-step to half-step voice-leading, which I would now explain by my theory of voice-leading attractions. Third is the employment of sensory consonance and dissonance as a structural strategy to replace the absence of a complex pitch space. This notion is implicit in Hindemith's (1937/1942) theory of harmonic fluctuation, and it broadly relates to ideas in the current school of spectral composition. In terms of my own work, however, all three theoretical ideas are developed systematically only in *TPS*. I was groping in the First Quartet toward ideas that I was able to formulate only many years later.

My music has relied upon a number of other theory-inspired structures as well. *GTTM*'s theory of grouping and meter has been a constant resource, as has the theory of scales described in *TPS*. I have simulated

timbral hierarchies (Lerdahl 1987) in orchestral settings and have often used *TPS*'s fundamental construct, the "basic space," in both its diatonic and various chromatic versions. There is much more to do in this regard, especially in relation to pitch-space paths and the calibration of patterns of tension and attraction.

In brief, my theoretical work has spawned not a comprehensive compositional system but a collection of related procedures that share a cognitive perspective. These procedures give my body of music, no matter how different individual pieces may be, an underlying unity and trajectory. To conceive a new work means, in part, to position it with respect to the previous use of these procedures and to open up new territory in relation to them. At the same time, there is a good deal in my composing that remains unsystematic. One of my ideals for a compositional method is that it seamlessly integrate the intuitive and the systematic. The best theory, in my view, feels so uncontrived that it seems to disappear into the musical fabric.

Modernism, Postmodernism, and Exploration

One of late musical modernism's attitudes for which I have little sympathy is its rejection of references to the past. Earlier modernists did not feel this way. Debussy and Schoenberg, for instance, freely evoked past styles as the aesthetic occasion demanded. With postwar modernism, however, such evocations came to be seen as embarrassing lapses or, if pursued to any length, a symptom of mental softening. Because of this attitude, Strauss was believed to be in decline after *Elektra;* Berg was seen as a nostalgic Romantic, inferior to the constructivist Webern; Bartók's high point was judged to be the acerbic and rigorous Fourth Quartet, after which his work supposedly weakened with the increasing use of triads and folk tunes. This attitude is still prevalent among latter-day modernists, who shudder when a triad or a tonally referential melodic figure appears in a new work. Minimalist pieces are less likely to evoke this reaction, probably because extreme repetition neutralizes the material.

That I have no affinity for this attitude was already clear in the decision in *GTTM* to focus on Classical tonal music as the idiom through which to erect a theory of musical cognition. *TPS* shows how the same underlying formalisms apply, with appropriate adjustments depending on the stylistic input, to highly chromatic and atonal music. In both theory and composition, I have a unified rather than compartmentalized view of music. For my music to shun allusions to older music would be out of character.

A second modernist attitude that I do not share is its projection of an impersonal mask. One hears this in the music of composers as different as Babbitt, Boulez, Ligeti, Reich, and Andriessen. The stance tends to be one

of tough objectivity. Evidently this is a reaction against the subjective inwardness of the Romantics and the second Viennese school. The frequent use of quasi-mechanical processes assists this aesthetic stance.

The double effect of eschewing the past and the subjective is to lend much late modernist music a one-dimensional quality. This attribute is unlike the other-directed spirituality of a Palestrina or a Messiaen; it is self-contained, often sensuous but cold. Soon this music will be old, and it will not evoke a web of cultural and expressive reference in the way that, say, *Pierrot Lunaire* and *Agon* continue to do.

Yet I rarely feel affinity for postmodernists who freely quote or imitate earlier tonal models and who indulge in a Romantic confessional mode. My objection is less one of principle than of realization. In my view, quotation works only if it is done with irony and if it fits structurally within its context; imitation succeeds only if it is realized as well as that which it imitates. Subjective expression is at least as demanding in its constraints (even if they are difficult to articulate) as the most hard-edged construction.

In my dedication to systematic thinking and formal coherence, then, I am more modernist than postmodernist. Yet, if the occasion calls for it, I enjoy the challenge of incorporating allusions into my musical style in an organic way. Nor do I hide behind a hard mask and deny personal expression, a posture that seems to me sterile. I lose interest in music that lacks inwardness. In short, I do not conform to either the modernist or the postmodernist stereotype.

A different angle on the modern/postmodern issue is the extent to which a composer explores new territory. For composers of earlier generations, this usually meant breaking the barriers of what had been stylistically normative or acceptable. Works of this kind are *Erwartung, Gruppen, 4'33"*, and *Atmosphères.* The exploratory spirit would seem to be the province of the modernist. Yet one of the first postmodern works, Berio's *Sinfonia,* was composed in an exploratory spirit; so was Adams's *Harmonielehre.* With no more rules to break in the old avant-garde sense, what counts as exploratory has become a rather subtle matter.

I value the exploratory spirit, but for me it has taken a different form than for the usual modernist. Recovering tonality in a fresh sense and being able to juxtapose the extremes of consonance and dissonance in a coherent way seemed very exploratory when I started doing these things in 1974. Inventing the syntax shown in figure 1 was exploratory. A similar spirit hovered over a 1994 orchestral piece that was written *pianissimo* throughout and completely in streamed, overlapping, and expanding and contracting variations. My sense of the exploratory is driven not by breaking down old barriers but by the urge to find new ways to organize existing materials. The problem of musical syntax haunted the twentieth century

and remains a primary issue for the twenty-first century. Beginning with the breakdown of traditional tonality almost a century ago, this issue seems to me to be the fundamental problem of modern music, even more than the commerical decline of classical compared to pop music or the marginalization of contemporary within classical music.

Boulez, as I understand it, faced the modernist crisis in the 1960s and envisioned a solution different from what has been discussed here. Seeking to continue to be exploratory in the traditional avant-garde fashion, he found himself outflanked by the experiments of Stockhausen and Cage and enmeshed in the hopeless dialectic of total serialism vs. chance. There was no consensual wave of the future, no way to lead as before. He instead imagined the *deus ex machina* of music technology and began plans for what became IRCAM. If music history and the barrier-breaking mentality of the avant-garde no longer guided musical progress, then technology, which is incontestably in a perpetual state of revolution, might come to the rescue. And in a crucial way Boulez has been proven right. The exploratory spirit among young composers has migrated increasingly to applications of computer technology. However, technology only offers new means; it does not solve the cognitive and aesthetic problems of musical organization.

I welcome exploration through music technology and am glad to engage it. In this regard I have two broad research goals that impinge on my compositional thinking. First, computational models of cognitive music theories, including the combined *GTTM/TPS* theory, promise to facilitate the investigation of cognitively transparent compositional systems. Implementation will render trivial some compositional methods that used to be seen as profound and will facilitate perceptually viable computations that before would have been inconceivable. Second, computer technology enables the exploration of timbral organization and its relation to other musical dimensions. For more than a century, timbre has played an increasingly central role in composition, but its structure-carrying potential is still poorly understood. A related development is the growing use of microtonal tunings. These tendencies are especially evident in the spectral approach to composition. Spectralism's main shortcoming is that it has not succeeded in bridging the gap between the exploration of sound and audible form; the timbres and tunings cannot yet bear the musical weight that is demanded of them.

To pursue issues such as these stirs my creative imagination. I hardly expect many composers to share this appetite, although I think it would be good if American composers placed more value on the intellectual side of their craft. In any event, such has been my path, and as I continue my explorations I shall make compositions that incorporate cognitively plausible modes of organization, accept the past, and express inwardness.

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