

## Composition, and Cognition: A Response to Boros

John Halle 3/23/96

It is appropriate that James Boros should be "disturbed" by and, consequently, respond so emotionally to, Fred Lerdahl's article "Cognitive Constraints on Compositional Systems." Lerdahl's piece, its "scholarly" tone notwithstanding, was intended to provoke. Provocations should at least cause a reaction. Despite a few snide remarks here and there<sup>1</sup> "Cognitive Constraints," in the near decade since its publication has elicited very little reaction, at least in print. Based on the relative absence of response, one could easily get the impression that Lerdahl has beaten a dead horse--that the blind reliance on serial strategies and denial of the relevance of innate musical intuition to composition and listening which characterized certain segments of American and European modernism is no longer a position which can be defended in the present intellectual climate. Whether or not this position is defensible, Boros' response demonstrates that there are those who remain in the business of defending an aesthetic ideology long since recognized by most composers as bankrupt.

Whatever its aesthetic liabilities, an intellectually attractive aspect of the first generation of American serialism was its reputation for analytical rigor and artistic seriousness of purpose. If Boros' work is any indication, the present generation no longer feels it necessary to uphold these standards. In place of argumentation, the bulk of Boros' attack on Lerdahl consists of unsubstantiated

---

<sup>1</sup>See Kyle Gann, Village Voice J.J. Nattiez (in press)

invective. Thus, he describes Lerdahl's methodology as "pseudoscientific" and "subjective." Lerdahl is guilty of "drastic, hideous simplifications" in his understanding of the technical literature, which he makes use of in "an extremely biased, selective [sic] way." What is more, Lerdahl's larger objective is to "enslave[s] the listener." "The resulting hodgepodge" as Boros characterizes "Cognitive Constraints," is "silly. . . having absolutely nothing to do with . . . artistic creation." These continue until he is virtually frothing at the mouth, accusing the composers contributing to the collection of essays in which "Cognitive Constraints" is reprinted, of "moral smugness", "complicity with reductive, depthless deaestheticization" and finally, finding in this new generation of tonal composers, incipient "fascist" tendencies.

These allegations are leveled without evidence. Indeed, some of the charges are themselves contradicted by Boros own text. For example, Boros charges that "Cognitive Constraints" is "pseudoscience" while immediately noting that it "was first published in a collection with a strong scientific orientation." (p. 544) Evidently, Boros expects us to rely on his understanding of what constitutes legitimate scientific inquiry over that of the editor of this important volume. When Boros gets beyond ad hominem to actual substantive criticisms, these are invariably based on straw man positions which he has attributed to Lerdahl. Thus, Lerdahl is said to reject "body-oriented ways of coming to grips with music." (p. 545) Whatever this means, one can find nothing of the kind in Lerdahl's essay. Boros would also have us believe that Lerdahl

"rejects . . . 'sensuously attractive' music." This judgement is derived from a reading of the following passage:

Certain recent musical developments (pioneered for instance by Ligeti) have tended to blur distinctions between events. Sensuously attractive though this blurring may be, it inhibits the inference of structure. (Cognitive Constraints, p. 239)

Obviously what Lerdahl is "rejecting" is music which has momentarily "sensuously attractive" qualities but which cannot sustain a listener's interest. While not all listeners would agree on which pieces induce the sort of ennui which Lerdahl is referring to (Ligeti's work, for example is, for most of us not included in this category) anyone who has spent time with modern music is being disingenuous if he or she denies that such experiences are completely unfamiliar. While Boros might deny that he has ever been victimized by such pieces, the claim that Lerdahl is rejecting "sensuously attractive music" is false: Lerdahl is rejecting music which is tedious because it is "attractive" in this respect and in no other--hardly the wholesale rejection which Boros misleadingly attributes to him.

Similarly misleading is Boros' characterization of Lerdahl's conception of what constitutes a musical "grammar" and its function in musical processing. In "Cognitive Constraints" and in GTTM, Lerdahl and Jackendoff follow the lead of four decades of research in various fields of cognitive science, most notably linguistics<sup>2</sup>, in advancing a "listening grammar" that captures certain aspects of the system of intuitions which operate when listeners process music.

---

<sup>2</sup>see also Marr() important work and Gallistel. Also Bregman.

Boros refers to this "grammar" as "poorly defined," while nowhere referring to any specific "poorly defined" term or construction within the grammar. Rather, his real objection seems to lie in his impression that Lerdahl conceives of the "listening grammar" as "a singular, static entity, presumably employed by all listeners to a given piece, as if, regardless of differences in gender, ethnicity, cultural, and social background, listening environment, and so on we all listen the same way, each and every time." (p. 545)

There are two positions being attributed to Lerdahl here, each of them trivially false, and not coincidentally, diametrically opposed to what one actually finds in GTTM and "Cognitive Constraints." (1) Lerdahl claims all listeners process that which they hear in the same way independent of their musical background. (2) a listener assigns an invariant "final state" structure to what he hears. As far as (1) is concerned, not only does Lerdahl not claim that listening grammars are "universally" shared by all listeners, in fact he insists that the opposite is the case. A fundamental assumption of GTTM, borrowed from generative linguistics, and articulated in the first sentence of the first chapter, is that of an "experienced listener in a musical idiom." Were Boros' even minimally familiar with Lerdahl's work he would be aware of this assumption which requires that "differences in gender, ethnicity, cultural, and social background" which define "musical idioms" will be incorporated in the "listening" grammars all those exposed to music construct and subsequently bring to bear on what they hear.

As for (2), while certain aspects of a listener's mental representation of a passage are more or less "static" (for example, a

Strauss Waltz will tend to be heard by most listeners in triple meter, whether they hear the piece during an eclipse, in Angola, or after having changed their gender) considerable attention is paid in GTTM to cases where a musical surface resists a listener's attempt to assign it a unique structure. Such passages are referred to as ambiguous, a subject dealt with in considerable detail in GTTM as well as in subsequent articles by both Lerdahl and Jackendoff.<sup>3</sup> GTTM accounts for these ambiguous hearings as resulting from conflicting structural descriptions generated by the preference rule system which they advance. Boros might not find GTTM's explanation of ambiguity compelling, or he might have an alternative means to account for the relevant experiential facts. Whatever the case, Boros' impression that the listening grammar requires that "we listen that same way each and every time" is based on a total ignorance of how this grammar is shown to function in a musical context.

To return to Boros' misconstrual of (1), it should be noted that while Lerdahl insists on the role of the listener's unique experience in the shaping of the "listening grammar", he assumes uncontroversially from the point of view of virtually all productive research paradigms in cognitive science, the existence of a significant innate component in its formation that constrains the range of interpretations of a musical surface. In GTTM, Lerdahl and Jackendoff attempt to distinguish between those aspects of musical processing which they feel are universal, and hence innate, and

---

<sup>3</sup>See for example, Jackendoff (1992), in particular his discussion of Meyer's "On Rehearing Music."

those which are more likely learned from an exposure to a particular musical tradition and consequently, are idiom specific.<sup>4</sup> This is, to reiterate, far from claiming that a wide range of hearings of a given passage or piece are not possible among listeners of even for a single listener nor, for all practical purposes, does it significantly diminish the role of "cultural difference" in determining how a listener will mentally represent music.

Rather what it does claim is that *aspects of* a listener's capacities are "innate" and that "cognitive constraints" arising from these capacities influence how we relate to what we hear. It is the possibility that, to some degree, "nature calls the tune", as Richard Taruskin puts it, which seems to infuriate Boros and his neo-serialist comrades in arms<sup>5</sup>. As the evidence mounts supporting this picture of the human mind and by extension, the human ear, this school has responded not by refutation but by retreating still further into its bunker. Hence, the resounding silence which has greeted "Cognitive Constraints" in Boros' circles, only now being broken. The basic thrust of Boros' article is what one would expect from a mentality deeply in denial: the substantive issue of what influence the way we hear should have on the way we write is scrupulously avoided, and evidence is marshalled solely for the purpose of stifling discussion on the subject. According to Boros, nothing can be said about questions of compositional practice and innate human psychology because "no one really knows anything about how human cognition is structured" and "the existence of a large,

---

<sup>4</sup>See GTTM p. 96

<sup>5</sup>See Jeff Nichols NYT's letter

growing body of literature based on cognitive models in which, depending on the type of processing, hierarchical and nonhierarchical (i.e. network-based) representations may coexist." (Incidentally, here again, Boros seems not to realize or care that his recognition of a "large literature" advancing various cognitive models directly contradicts his pronouncement that "nothing" is known about the structure of cognition.)

Boros' appeal to the lack of consensus among cognitive scientists studying these issues is a red herring. For even if there were no relevant work being carried out in the fields of cognitive psychology--visual and auditory perception, not to mention cognitive music theory--the existence of cognitive constraints roughly of the sort Lerdahl advances can be confirmed by appealing to common sense. To take a seemingly frivolous but completely unambiguous case, no listener, regardless of his previous musical experience, cultural background, gender, etc., will be capable of processing, and hence, will attribute any "structure", find "sensuously attractive", or be brought to tears by a musical surface composed of frequencies outside of the auditory spectrum. Composers, regardless of culture, gender, etc. have tacitly accepted the existence of the particular perceptual and hence ultimately "cognitive constraint" that music should predominantly make use of pitches that can be processed by normal human psychoacoustic faculties. Compositions which violate this or other universal constraints are, to use Lerdahl's convenient term, "cognitively opaque." A listener's processing faculties are not engaged, which is

to say that s/he responds to such works by "shutting off" and, most likely, becoming bored.

One could advance other similarly trivial, but equally powerful constraints having to do with other acoustical parameters-- amplitude, intensity, timbre-- but the point is clear: Boros' denials notwithstanding, anyone capable of having a musical experience implicitly accepts the existence of both "cognitive constraints" and "cognitive opacity." Furthermore, far more important than the underlying theoretical issue is that anyone involved in contemporary music during the high modernist period has a direct and probably substantial experience with "cognitive opacity" or to be blunt, more or less intense forms of boredom. It is this fact, more than any other which is the basis of "Cognitive Constraints' " provocation. By advancing a plausible account of how listeners hear (it emphatically does not, as Boros charges, dictate how they "should hear") it is able to explain why boredom and tedium are the natural responses to much of what was being offered to them by modernist composers, and why, subsequently, listeners have implicitly voted (negatively) with their feet on most of the most sacred modernist propositions.

Boros professes to have no problem with this verdict of not just the larger musical public, but of even the most potentially receptive and sympathetic sectors of "serious music" audiences. He cites approvingly the remark of poet Charles Bernstein that "we have to get over, as in getting over a disease, the idea that we can all speak to one another in the universal voice of poetry." While this recognition perhaps indicates a world-weary retreat from the "who



cares if you listen" philosophy promulgated by a previous generation of modernists, ultimately it is not far from it. The growing acceptance of the essence of Lerdahl's theoretical work will have the effect not of "enslaving" listeners, but of liberating them to trust the validity of their own responses. It invites audiences to have reactions and be participants in musical events and not just be passive consumers of some more or less indecipherable compositional code. It thereby offers the possibility that music can "speak" to audiences across divisions imposed by class, race, culture and gender. Boros' stated appreciation for the music of Coltrane and Kurt Cobain indicates that he is aware that music can have this function. It is a pity that he wants to prevent those who, like him, make use of traditional "classical" compositional methods from becoming participants in the wider musical and intellectual culture.

