MUSIC COGNITION AS MUSICAL CULTURE

A PHILOSOPHICAL INVESTIGATION OF COGNITIVIST THEORY OF MUSIC

by

Alan Earle Stellings

A Thesis submitted in conformity with the requirements for the degree of Doctor of Education Department of Theory and Policy Studies in Education Ontario Institute for Studies in Education of the University of Toronto

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1997

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ABSTRACT

In the field of cognitivist theory of music, the major philosophical thesis that has emerged is that music cognition is caused by a dedicated information processing system which manipulates musical symbolic codes. These codes are said to be neurally encoded, musically evaluable representations of an external musical reality that mediate cognitively between a knowing subject and a world of known musical objects. Cognitivist theory of music is premised on the formalist philosophical view that music consists of a set of aesthetic objects to be comprehended solely in terms of the audition and subsequent cognition of its tonal, rhythmic and structural properties. This thesis is a philosophical investigation and critique of cognitivist theory of music and its correlative theory of mental representation as cognitive mediators. Using Wilfrid Sellars' framework of the manifest and scientific images of "man" in the world, salient features of the aesthetic point of view are analyzed in order to bring out the irresolvable difficulties that have been inherited in cognitivist theory of music due to an adherence to a representationalist theory of the nature of mind. I argue that the difficulties inherent in the cognitivist "scientific-image" theory of music are compounded by an outmoded conception of science (and of causality in particular) which leads to a rejection of the person for a theory of the musical mind. I claim that cognitivist theory of music cannot ignore the priority of the manifest image of music as a continuing context for scientific theorizing. As a positive alternative to the representationalist notion of the cognitive mediator, I advance the beginnings of a theory which regards the musical mind as involving a direct, dynamic, cognitive interaction between persons as subjects and the familiar, "manifest-image" world of musical culture. This kind of interaction is an interpretive one which is conditioned by a socio-cultural set of concepts and practices, including those of scientific theorizing. It is within this context that a theory of the musical mind relevant to music education research must be set.

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Chapter 1

Introduction

1.1 Opening remarks

Music is a ubiquitous and extensively varied human phenomenon. It enters into many aspects of life. We can hear it virtually everywhere, and often not by choice. Music comes to us in a multitude of manifestations: as concert presentations, entertainment, functions for rites, ceremonies and holidays, as background sounds, to mention a few. Music is often linked with linguistic and visual forms such as opera, storytelling, song, film, music videos. Music can be presented in notated or nonnotated fashion, improvised, presented live or through recordings. Music can be listened to, performed and composed. It is probably not unreasonable to say that music enters the life of every human being and intuitively, people seem to have a good idea what music is. Music is very intensely studied from various points of view. Due to the wide variety of musical styles forms and activities, the disciplines of musicology, ethnomusicology, theory, and music history have been compelled toward further and further specialization. Since music is such a widespread and continuously changing phenomenon, attempts to define it in specific terms of formal, cultural and/or historical analysis can at best be likened to taking snapshots through very small windows.

In order to account for and explain the mental processes involved in composition, performance and listening, music can also be studied from the scientific point of view. Earlier approaches to the study of music cognition attempted to find a correlation between perceptual and cognitive activity. Gradually, the status of 'perception' in music cognition theory has diminished to the point where it is now generally not considered to be an active component of music cognition. Other theoretical directions taken have included studying the various relations between linguistic and musical cognitive processes, between music's temporal properties and music cognition, or the relation between the deep cognitive structures that are said to cause music cognition and music cognition itself.¹

^{1.} I shall elaborate on the history of cognitivist music theory in Chapter 4.

1.2 General argument

Common to all cognitivist theory of music (hereafter CTM) is the assumption that music cognition is caused by the activation of an internalized set of mental processes and structures. CTM assumes that a full explanation of music will eventually emanate from the study of those internal mental processes and structures. Contrary to the cognitivist position, I contend that music is first and foremost a social construction, and that individuals receive music from their respective cultures. In my view, to say that music is caused by mental structures and processes is essentially uninteresting, because it limits the discussion to brain processes and misses the essentially social nature of the activity. That is, CTM does not offer a convincing explanation of the effect an individual's environment or culture has on her participation in music, except perhaps in terms of some very restrictive conditions having to do with an individual's auditory-cognitive domain.² In other words, I contend that individualistic (and internalist) approaches to music fail to explain it in terms of its essential historical, cultural and social aspects. As I shall explain, there are very specific reasons for that failure.

Let it be said, however, that it is not my intention to set up a strong dichotomy between music as psychological theory and music as social theory. It is also not my intention to downplay the considerable achievements in music psychology. My purpose in making this study is to find an adequate way to speak philosophically about CTM and to bring to light certain facts about the relation of aesthetics to psychology of music. My goal is to suggest that, in order to embrace more effectively the social, historical and cultural aspects of musical life as they relate to individuals, certain paradigms for thinking about the psychology of music are due for a re-examination or perhaps, more accurately, a re-conceptualization. It is my hope that this philosophical investigation and my subsequent suggestions for a broader philosophical approach will provide the basis for a re-evaluation of theory-making which will take into account the wider environment in which the individual finds herself.

^{2.} I shall elaborate more fully on this point in Chapter 5. For now, I shall cite John Shepherd (1991), who states that "by restricting music to the inner and mental worlds, [psychological theories] deny music *substantial* significance beyond its 'mere existence' as form. Indeed, a *purely* psychological significance can only be assigned to music...by denying the interdependency of the two dichotomies" (pp. 31-32), found in such dualisms as mental/physical, inner/outer, subjective/objective epistemology, etc.

My critique of CTM centres on two points of contention. The first point of my argument is that CTM is incorrectly premised on a philosophical point of view that narrowly presumes that music is a set of aesthetic objects, and specifically that musical aesthetic objects, i.e., works of musical art, are the centrepieces of the 'aesthetic point of view' (hereafter APV). The APV entails an assessment of artistic value solely in terms of the perception/cognition of the formal unity of a work of art and/or the intensity of its regional qualities. The perceptual/cognitive mode excludes any means of apprehending a musical work which may be outside the auditory-cognitive domain, such as through social, cultural, personal or historical approaches, etc. Within the parameters of the APV, such means are considered to be extra-musical.³ CTM argues that the cognition of music ought to be explained in terms of a naturalized form of the APV. The APV is understood by cognitivist approaches to music to be a natural feature of the music cognizing apparatus, and therefore is considered to be a universal property of music cognition for all musical idioms.

My argument against this approach to theory-making is that it is self-limiting, because the APV is in itself a product of certain social, cultural and political forces which can be traced back to eighteenth and nineteenth century Europe. Because the APV is a philosophical position which is by no means universally accepted, I contend that it is culturally imperialistic to assume that the APV provides the basis for providing explanations of universal cognitive processes and structures.⁴

My second point of contention criticizes the widely-held assumption by CTM that the manifest image of music-in-the-world (hereafter the manifest image of music) supervenes on the scientific image of music-in-the-world (hereafter the scientific image of music). The generally accepted definition of supervenience in cognitive science states that the mental of a cognizing agent is totally determined by its physical nature. The manifest image of music accounts for music as a cultural and historical phenomenon, embracing diverse points of view, including

^{3.} I shall elaborate on the APV in Chapter 2.

^{4.} I shall elaborate on this point in Chapters 2 and 10.

APV and non-APV points of view. A description of the manifest image of music entails how music is evident to us in terms of the observable, including the whole set of musical works and how they sound, the various sets of practices connected with the production of music, and even the whole range of ideational or representational frameworks in which music may be conceived. On the other hand, the scientific image of music accounts for music as a cognitive phenomenon, specifically as the cognitive structures and processes which take place at an atomistic level (in the brain) which therefore cannot be seen or directly experienced, but which nevertheless are deemed to be causal to the way humans experience music in the manifest world. The scientific image of music also works under the assumption that the music cognizing apparatus operates mandatorily, involuntarily and innately in terms of a naturalized instantiation of the APV. The products of these operations are said to be caused by naturally instantiated "aesthetic attitudes."⁵

My point of contention is that the premise of the supervenience of the manifest image of music upon the scientific image of music is a mistaken basis for theory formulation. The fault in the orthodox supervenience argument usually appears when a CTM begins by identifying music as a cultural phenomenon. The standard method is then to proceed to provide explanations for music as a product of culture in terms of the scientific image. The catching point is that scientific explanations of music inevitably rely upon the terms and language of the manifest image of music. There seems not to be a scientific language for describing music that effectively replaces the language of the manifest image. In other words, scientific explanations of music have not found a way to explain music as a scientific (i.e., atomistic) phenomenon without first relying upon the terms and language of its manifest image to make those explanations.

As stated earlier, cognitivist explanations understand music to be a collection of objectified, materialistic processes and structures in the brain. Within the restrictions imposed by the APV, scientific descriptions of said cognitive processes can be made only in terms of

^{5..} I shall elaborate on the manifest and the scientific images in Chapter 3. I enter into an extended discussion of the naturalization of the aesthetic attitudes in Chapter 8.

such formally-conceived musical entities as tonal-rhythmic patterns or structures of musical form. The restrictiveness of this approach puts into question the supervenience hypothesis because there is failure to account for the broader terms encompassed by the manifest image of music. I contend that it is more correct to say that the scientific image of music supervenes upon the manifest image, even within the stipulations of the APV.

Unfortunately, the object-style language and terms employed by CTM does not account for persons within a musical culture: only formal mental processes and structures. In order to account for the whole of human musical experience as both a cognitive and a cultural phenomenon (that is, in terms of the practices, the created works, the ideational and representational frameworks of all musical idioms), music cognition theory must first adopt a conceptual framework which entails an accounting of persons who participate in the music of their respective societies. With a reversal of the orthodox supervenience hypothesis, it is my hope that the concept of persons as participating members of musical cultures can find a central role in future explanations of music.

1.3 Chapter outline

In Chapter 2, I offer a detailed explanation of the APV, with the purpose of carving out a distinction between a narrow and a broad understanding of the idea. This will be achieved with a view to contextualizing, historically and culturally, the eighteenth-century notion of the APV as first established by the German philosopher, Alexander Baumgarten. To that end, I shall provide a brief historical background (specifically in terms of the Platonic and Aristotelian views) for the modern idea of aesthetics. I then move forward to the eighteenth century and discuss Baumgarten's contribution in terms of how the APV has evolved in modern times. At this point, I offer an in-depth analysis of the features of the APV. In the final section, I relate the APV to CTM, specifically concerning the dichotomy between subjective and rational forms of aesthetic judgment.

Chapter 1: Introduction

In Chapter 3, I discuss the manifest and scientific images of music, and how this dichotomy pertains to CTM. Taking my inspiration for this idea from the contributions of Wilfrid Sellars and Jay Garfield, I contend that one of the two central problems with CTM has to do with the issue of supervenience. CTM presumes that the manifest image of music supervenes on the scientific image of music. I point out that this position rests on the premise that the APV is an ontological rather than a theoretical matter. I propose that in order to account for music properly as primarily a cultural phenomenon (involving the interaction of persons in a wide and irregular environment), a reversal of the supervenience issue is in order, with the manifest image of music being taken as prior to the scientific image, or, in other words, that the scientific image of music supervenes upon the manifest image. Next, I examine the features of the synthetic and the binocular resolutions as two potential solutions to the problem of reconciling the two images. I conclude the chapter with an examination of the autonomy principle and the issue of domain demarcation in CTM. I discuss how those two notions impinge favourably upon a scientific approach to supervenience.

In Chapter 4, I contextualize historically the current state of affairs in music cognition theory. My hope is to show that the present situation does not exist in historical isolation, but rather is at a stage in a long progression of theory development that has been going on for approximately the last century and a half. I classify the stages of historical development of music cognition theory as falling into four general models which more or less follow a chronological order. I name those models respectively the psychoacoustic model, the cognitive model, the pattern structure model, and the processing-rule model. In addition, this chapter will also serve as an introduction to more recent theory development in terms of CTM, specifically the processing-rule model, as exemplified by the work of Heller and Campbell (1976, etc.) followed by Lerdahl and Jackendoff (1983). Processing-rule models focus on descriptions of how innate cognitive structures permit music cognition to take place. Due to the detailed treatment I wish to make of the contributions of Heller and Campbell and Lerdahl and Jackendoff respectively, I shall devote separate chapters to their models. In Chapter 5, I examine the theoretical model of Heller and Campbell (hereafter H/C), the first in a line of what I call 'processing-rule' models of music cognition. Briefly, a processing-rule is an underlying grammatical protocol, unavailable to introspection, which governs the processing of tonal and rhythmic patterns in music. Prior to H/C, in the history of music psychology, the concept of a link between the auditory stimulus, the auditory apparatus and subsequent cognition governed theory development. With H/C, the conceptual framework for theory development changed. H/C's model is the first to introduce the argument that perceptual processes and apparati are not integral, but are rather simply instrumental to music cognition. With the elimination of auditory perception as a component of music cognitivist terms. Thus, the processing-rule model established the argument for a scientific image supervenience base for music. The remainder of the chapter focusses on my critical commentary of the model, particularly in terms of such issues as the notion of music as communication, the notion of contextual dependency, and the relation of the scientific image to the notion of awareness.

In Chapter 6, I examine the 'generative musical grammar' model of music cognition as proposed by Lerdahl and Jackendoff (hereafter L/J). L/J's theory of a generative musical grammar is another version of the 'processing-rule' model. Recall that the processing-rule model assumes the existence (at a level unavailable to introspection) of implicit rule sets underlying the mental construction of musical tonal-rhythmic patterns. L/J's model is differentiated from H/C's in that it takes one further step in the progression of the internalization of music cognition. L/J's central hypothesis is that a generative grammar does the work of providing a *structural description* for any tonal piece which in fact describes the structure that a listener experienced in a given idiom infers in the hearing of a piece. As with H/C's model, L/J's model adheres to the 'hard' construction paradigm (as defined by Fiske, 1992) in which music, rather than residing in the acoustical signal itself, is a mentally constructed entity. Therefore, according to L/J, music is a mental construct which results from the acoustical signal's triggering of mental (cognitive) operations that in turn impose order on the information derived from that signal.

Following a strictly cognitivist line of reasoning, the rules of the generative musical grammar are unavailable to introspection. In this sense, L/J follow a similar line of thinking as H/C, by proposing that music is a natural feature of the mind, as one part of the whole set of natural human intuitions. Based on this premise, L/J also grant primacy to the scientific image of music, in that their explanation of the manifest image of music as a cultural entity is deemed to be the causal result of inaccessible and individualistic mental entities and processes.

In order to contextualize the generative grammar model, topics considered for discussion include the relation of the model to Chomskian/Cartesian mentalism, the notion of the idealized listener, and a constructionist definition of music. I then outline the pre-theoretical axioms and limitations of the model and a provide a brief description of its principal features. My critical commentary touches on issues pertinent to problems with the model, which include discussions concerning the auditory perception/music cognition paradigm, the Schenkerian analysis paradigm, and how much contemporary music impinges unfavourably on the operations of the model. I conclude the chapter with a discussion of the relation between behaviorism and the generative musical grammar model.

In Chapter 7, I examine what I call the 'temporal cognitive processes' model. This model, developed by Mary Louise Serafine (1988), seeks to test the hypothesis that there exists in humans a generic music cognitive processing capability. This capacity is said to be acquired through the genetically-controlled development of internal cognitive operations. The 'temporal cognitive processes' model follows strict cognitivist lines in that there is a presumption that music does not reside in the external world of sounds, scores, or even in the sensations of sounds, but rather in the internal world of cognitive constructs, a mental world of thoughts concerning musical sounds and their relationships. Within the stipulations of the model, the sensory/perception domain is strictly non-cognitive and the cognitive domain is in turn strictly non-perceptual. The temporal cognitive processes model is uniquely organized according to temporal and nontemporal processes. The uniqueness of the model arises from the interesting

and perhaps contentious ontological assumption that the temporal aspects of music are *described in sound*, reversing the traditional concept that sounds exist in a temporal framework.

I begin the chapter with an outline of the pre-theoretical premises and a description of the model itself, including the temporal and nontemporal processes and a discussion concerning Serafine's developmental approach to music cognition. I follow that with a critical commentary which focusses on issues including the epistemological and ontological problems of the model, specifically the question of sound and time in music, temporal, nontemporal and style-specific processes, the notions of simultaneity and succession, the constituent elements of music, and problems concerning defining music in terms of the APV.

In Chapter 8, I examine what I call the 'rule management system' model of music cognition. The rule management system model, developed by Harold Fiske (1990, 1993), is differentiated from the 'processing-rule,' the 'generative grammar' and the 'temporal cognitive processes' models with the introduction of a third principal component into the theoretical design. Two-component theories consist of a processing-rule set and a description of the tonalrhythmic patterns resulting from the computations exercised by the rule sets. Two-component theories are interested only in the descriptions of the rule sets themselves and/or of the products of computation. Three-component theories, however, have an additional interest in the actual processes involved at the decision-making level. The motivation behind introducing pattern decision-making activity as a third component is that in two-component theories (in particular, the 'musical grammar' model), the sets of rules are reputedly not sufficiently anchored. This is because the establishment of new rules is deemed to be too dependent on empirical findings drawn from extant musical repertoire. The 'rule management system' model offers a solution to this problem by further internalizing the processes of music cognition with a view to finding a way to examine the (proposed) generic system that manages the rules sets themselves. Nevertheless, a stipulation of the 'rule management system' model is that it is not meant to replace or displace two-component models, but rather to clarify and amplify them. Inasmuch as musical mental constructs realized through overt performance or composition are

important, the 'rule management system' model presumes that cognitive decision-making structures are logically prior to resultant mental constructs emanating from composition, performance and/or listening.

Chapter 8 begins with an overview of the philosophical underpinnings of the model, the pre-theoretical premises (axioms), and a description of the model itself. My critical commentary focusses on issues concerning the naturalizing of the aesthetic attitudes, the trichotomy of innateness, community and musical formalism, the relation of musical meaning and musical communication, and the relation of community to the manifest image of music.

In Chapter 9, my intent is to present a rationale for a wider conceptual framework within which to begin to formulate a model of music cognition theory, one which takes into account the ideational and artistic frameworks found in twentieth century music. Music in the twentieth century has freed itself of the aesthetic parameters required by the APV and in some cases even deals directly with ideas themselves. For the art of the twentieth century, this notion has loosened the conventions of what constitutes art to the extent that, at its most abstract, art has become purely conceptual. As the notion of conceptuality in art became more potent through the earlier years of the century, the importance of media in art subsequently decreased. Nevertheless, the APV, by definition, treats aesthetic experience as primary. However, I wish to show that not all art is necessarily 'aesthetic' (narrowly conceived), and by extension, that much of what makes music 'music' is not necessarily 'aesthetic' either. I contend that the tools for indexing pieces of music are found in the language of ideas, even when those ideas are 'aesthetic.'

To illustrate and fortify the above contention, I shall make a short survey of some of the more important musical idioms to emerge in the twentieth century. This will be done with a view to explaining the extent to which a cross-section of conceptual and/or relational (and specifically nonaesthetic) frameworks have motivated the creation of the musical works in this century and to what extent these so-called 'nonaesthetic' frameworks constitute their essence. This task will also be done with a view to establishing new or at least alternative criteria on which to form

a new or alternative conceptual framework for music cognition. As stated earlier, it is not my contention that the APV should be replaced, but rather contextualized in the larger historical and cultural scheme. I contend that by viewing the APV as a culturally (and historically) contextualized stance for apprehending music, the APV will step down from its present ontological status in music cognition theory and will take on a more appropriate theoretical role.

Issues investigated in this chapter begin with a discussion of the relation between twentieth century music and CTM. The remainder of the chapter is devoted to an examination of serialism, sonic entities, anti-rationality, indeterminacy and aleatory not just as an illustration of twentieth-century musical idioms, but with the purpose of providing a forum for discussion on the need for a realignment of the conceptual framework for music cognition theory.

In Chapter 10, I wish to spell out the remainder of my positive hypothesis. My intention is to focus upon several areas which deserve attention in terms of the development of a conceptual framework for music cognition theory which takes into account the view that music is a manifestation of culture, and that individuals receive and create their musical culture as an interaction of persons. Topics covered shall include a discussion concerning the dichotomy between rationality and intuitive experience, defining perception, the notion of metaphor and the experience of music as form, the relation between musical theory within the APV and musical practice, problems with the linguistics/music parallel, and a discussion of the idea of 'musical hearing' as either an active or passive process. The last two topics are somewhat interrelated: first, the idea of putting the person into a conceptual framework for music cognition; and second, how the idea of the music cognizing person impinges on the notion of musice ducation as aesthetic education.

Chapter 2

The Aesthetic Point of View

2.1 Introduction

As indicated in Chapter 1, I contend that the 'aesthetic point of view' (APV) underlies the premises and assumptions of contemporary music cognition theory (CTM). The models that will be examined in this study all presume that the music cognizing apparatus operates within the stipulations of a naturalized form of the APV. My response to the naturalization of the APV comes in the form of an argument that the APV itself is historically and culturally particular to Western aesthetic theory and that the conceptual framework of music cognition theory is instantiated in a narrowly conceived view. In other words, my argument is that the APV is not an ontological fact about music but rather should be interpreted as a theoretical stance which contextualizes a particularized conceptual framework for developing of theories of musical meaning.

My first task will be to trace the development of the APV as a cultural and historical notion, beginning with the ancient writings of Plato and Aristotle and concluding with remarks on the topic by such modern writers in twentieth century aesthetic theory as Langer, Bell, Collingwood and Dahlhaus, among others. My next task will be to develop a working definition of the APV. In order to achieve that, I shall rely in good measure upon a line of thought suggested in an article by Monroe Beardsley (1987) in which he unpacks several features of the APV. In the interests of contextualizing Beardsley's work in the terms of this study, I shall attempt to relate each step of his general explanation as it more specifically pertains to music. Finally, I shall attempt to relate the APV (in an introductory and general way) to CTM, specifically in terms of such contentious issues as subjective and objective judgment and the role of emotional response in aesthetic apprehension.

2.2 The aesthetic point of view as a cultural and historical phenomenon

2.2.1 Ancient aesthetic theory

The concept of formalism in aesthetic theory emanates from the idealist and realist philosophies of Plato and Aristotle. Three important axioms define the foundations for the aesthetic theory of the ancient Greeks. First, artworks were taken to be material examples of an unknown but truthful reality. Second, the concept of formalism in aesthetic theory was founded upon various versions of the supposition that a work of art has intrinsic value, specifically in terms of its form, its uniqueness, and for its timeless universality. Third, the ancient Greeks required the perceiver to have the requisite knowledge in order to properly perceive, understand and evaluate an object of art. The training to acquire such knowledge was said to be received through the experience acquired by direct contact with 'works' of art.¹

For Plato, the notions of knowledge and education are important keystones for interpreting sensory perception. Plato's cave allegory, in Book VII of *The Republic*, is a good allegorical description of his epistemological theory. The cave allegory graphically illustrates Plato's suspicion of sensory perception as a basis for knowledge. According to Plato, the light outside the cave represents a world of essences, the world of 'Ideas,' which exists in the mind and is realized only through the processes of contemplation and reason.

Aristotle develops an alternative solution to Plato's epistemology which attempts to embrace the notion of perception within a framework of scientific method. Through the deductive method (via the syllogism), Aristotle establishes a middle ground between the nature of things in the world and first principles of truth. In doing so, the notions of rationalism and materialism become the foundations for his conceptual framework of formalism. In opposition to Plato's notion of Ideas or Forms, Aristotle contends that matter, or physical extension, determines the potentiality of form, and he concludes that this potentiality is the result of cause. In the *Metaphysics*, Aristotle develops the notion of *telic-determinism* (i.e., matter evolving

^{1.} The 'work-concept' as an object of perception figures prominently in the fine art of the eighteenth century to the present. I follow this line throughout the dissertation.

into form), which underlies the notion of cause. Aristotle's explanation of the four causes (material, efficient, formal and final) creates the bridge he sought between the material and the ideal worlds. Briefly, the four causes are explained as follows: first, material cause, which is likened to a raw stone; second, efficient cause, which is likened to the sculpting of a raw stone by an artist; third, formal cause, which is likened to the creation of a statue. The final cause is defined as the universal essence of the notion, "statue," which Aristotle says is humanly unknown.

In *De Anima*, Aristotle describes 'form' as a dual notion which can either be located in the mind or can exist as a matter of genetic or hereditary necessity. The former is a description of form as in the mind of an artist who creates a statue. The latter describes form as the genetic necessity of an acorn to become a tree. In both ways, form is fundamentally a principle of structure, understood in such a way that the totality of the formal attributes of an object contribute to that object's uniqueness.

Aristotle's epistemology is similar to Plato's in that knowledge is presumed to be preexistent or predetermined. The difference between the two views is that for Plato the Idealist, truth is revealed, whereas for Aristotle the Realist, truth is discovered. However, both versions of their epistemological theories require the subsuming of various specific notions as consistency of value, significance of form, contemplation and cognitive processes. In contrast to relativistic or subjectivist aesthetic theories which have evolved since ancient times, the Greeks understood the values in a work of art to be inherent in the formal structure of the work and to be comprehended through the dual processes of reason and contemplation.

2.2.2 The context of contemporary philosophy

The modern use of the term 'aesthetics' is only a couple of centuries old. In the mid-18th century, the philosopher Alexander Gottlieb Baumgarten renewed the term 'aesthetics' by tying together the ancient notion of 'the science of perception' with the idea that the perception referred to is specifically that which is involved in the creation and comprehension of works of

art. Beardsley translates Baumgarten's use of the term 'aesthetics' as "the science of sensory cognition" (Beardsley, 1966: p. 157).² In turn, aesthetics came to be known as the study of the perception of objects of art. Thus, aesthetics came to involve a unique way of perceiving art which entailed treating the object of art as an 'aesthetic object.'

Baumgarten contrasted things perceived (i.e., aesthetic entities) with things known (i.e., noetic entities), and then referred to aesthetics as the investigation of the former. Baumgarten then placed the fine arts under the umbrella of the notion, 'aesthetics' (a term which is not to be interpreted as the philosophy of art). Baumgarten stressed the ideational character of art, but in a particular sense; that is, with the composite of ideas which was deemed to be connected to sense data.³ Baumgarten promoted the idea that art is founded upon mental representations that are both sensory (i.e., based in sensory perception) and connected with feelings (what he thought of as something akin to 'inner subjectivity'). In tying the notion of a particular artwork-as-object to its appropriate perceptual process, Baumgarten subsumed such activities as the creation and performance of music, the creation of visual art, and dance performance, poetry reading, etc. under the aegis of the type of artwork appropriate to the activity.

This commitment to the primacy of perceptual experience led to the invention of the 'Faculty of Taste.' It was thought that a highly developed sense of aesthetic taste enabled a person to make subtle and sophisticated judgments of artistic expression, an attribute which was thought to be unavailable to a so-called 'uncultured' person. The new Faculty of Taste was characterized as operating within a context of 'disinterested' perception; that is, considerations of utility, self-interest, etc., were removed from the experience, raising to primary value the notion of 'immediate awareness.' Binkley states that "eventually aesthetics came to treat the object of aesthetic perception as a kind of illusion since its 'reality'—i.e., the reality of disinter-

^{2.} Beardsley's translation of Baumgarten's Latin term, aesthetica is scientia cognitionis sensitivae.

^{3.} For a complete explanation, see Baumgarten's Aesthetica (1750-8).

ested perception—stands disconnected from the reality of practical interest" (Binkley, 1987: p. 84). Thus, the notion of 'disinterested' perception became equated with the Kantian idea of treating aesthetic experience as something pursued 'for its own sake.' With aesthetic perception taking the fore in the study of art, the philosophy of art thus became viewed as a subset of aesthetics.

Along with the subsumption of the philosophy of art under aesthetics, it is my contention that a certain confusion has ensued from the notion that a work of art is construed primarily as an aesthetic object, and therefore, by definition, that it necessarily follows that an object of art must be construed as an object of perception. Binkley states that this view has led to the (mistaken) conclusion that "the meaning and essence of all art is thought to inhere in appearances, in the looks and sounds of direct (though not necessarily unreflective) awareness" (Binkley, 1987: p. 84, my italics). Binkley reminds his reader that the notion of Baumgarten's eighteenth- century definition of aesthetics as the 'science of perception' is far from being a dead issue. He observes that a survey of contemporary writing in aesthetic theory reveals that "this part of philosophy still accepts its raison d'être to be a perceptual unity—an appearance—and fails to recognize sufficiently the distinction between 'aesthetics' in the narrow sense and the philosophy of art" (Binkley, 1987: p. 85, Binkley's italics). It is Binkley's distinction between 'aesthetics' (narrowly conceived in an APV-based framework) and aesthetics (in the broader terms of the ancients, as all sense perception) that permits the narrow version (as a contemporary descendant of Baumgarten's initial conception) to be historically and culturally contextualized.4

In fact, it is on the basis of the APV, that is, on the unmediated perception of sound (i.e., the auditory 'appearance' of sound) that CTM sets its premises. Despite the many new directions taken by the philosophy of art and in particular, the philosophy of music during the twentieth century, Binkley notes that much of philosophy of art "is still practised under the

^{4.} Aesthetics, narrowly conceived, is wrapped up in the notion of the APV.

guise of aesthetic inquiry, which assumes that the work of art is a thing perceived" (Binkley, 1987: p. 85).⁵

Taken in the context of the history of music, the notion that music is exclusively an object of aural perception is a relatively recent attitude. It was only during Baumgarten's time that music began to be understood as a freestanding artform. Until that period, music was most often tied to other forms of expression, such as dance, poetry, drama or religious ceremony. In fact, Baumgarten paved the way for subsequent theories in music (e.g., those of Mattheson and Schiebe), which became part of an ongoing (and almost political) effort to justify the release of music from its centuries-old subjugation to poetry. This is not to say that music was not thought of 'aesthetically' before this time. The point I am making is that the notion of 'absolute' music (i.e., music dissociated from extramusical implications, such as programme music and especially song literature, in which the text influences or even sublimates the musical language and structure), was rather new. Bach and Mozart were early proponents of the new forms of absolute music.⁶

Thus, the establishment of the APV is closely associated, both historically and culturally, with the development of European art during the eighteenth and nineteenth centuries. In this sense, I am making a further claim that since the APV is a culturally and historically instantiated view, any formulations of music cognition theory taken from that view must, by force, carry similar limitations. However, as I shall explain in Chapter 9, the APV is not a view that is particularly well-suited for explanations of the musical art of the twentieth century (and perhaps other artforms, as well), and it may not even be a particularly well-suited philosophi-

^{5.} In Chapter 9, I shall illustrate a few of the significant directions that have been taken in twentieth-century music which are illustrative of the desire to remove the APV from its position of primacy.

^{6.} In Chapters 4 through 8 (i.e., those dealing with specific models of CTM), it will become evident that the focus of modern music cognition theory is on absolute music. In my view, this restrictive approach to explaining music cognition will do little in providing satisfactory psychological explanations for such multi-media artforms as opera and song, and (in a contemporary context) for music video, and other multi-media forms which tend to treat music as one aspect of a complex form.

cal point of view from which to explain the music of non-European cultures. Theodor Adorno (1973) stresses this point in his analysis of the music of Schoenberg and other music of the twentieth century. He predicts that the significance of the music of this century will not be found so much in terms of its effect on the listener as how it expresses the personal vision of the composer. This point of view represents a diametrical shift from a focus on the perceiver to a focus on the creator of art.⁷ Thus, by the early twentieth century, the APV, at least in terms of those participants involved in the creation and criticism of music, had begun to be relinquished in varying degrees.⁸

To illustrate the inappropriateness of the APV to the music of non-European cultures, John Baily (1985) contends that an ontology of music which is described in terms of the APV is in itself a phenomenon particular to a culture. Baily notes that in Western or Westernized cultures, music is regarded as "primarily a sonic phenomenon; study of motor control of music performance may be interesting but it is ultimately irrelevant to the central issue, which is the perception of musical sounds" (Baily, 1985: p. 238). In order to underscore the cultural bias of the APV, Baily gives two important counterexamples to this predominantly Western attitude. The first example is African *kalimba* (i.e., thumb piano) music, the significance of which is derived from the kinaesthetic organization imbedded in the hand motions of the performer. Any sonic organization which emanates from the performance of the *kalimba* player is viewed by connoisseurs of *kalimba* music as secondary and even irrelevant to the study of the motions which create the sounds, as a kind of 'aesthetics of movement.' A similar situation exists in Chinese *qin* (i.e., zither) music, in which the artistic focus is primarily on the correctness or the originality of hand motions of the performer, not on the sonic organization of the music. The

^{7.} See Chapter 9 for a more detailed explanation of this idea.

^{8.} However, this shift has not been evident in the CTM project. As noted in Chapter 1, this point is the basis of my contention that music cognition theories which presume the APV to be natural to musical cognitive processes are misconceived.

Western aesthetic view towards *kalimba* and *qin* as musical idioms would necessarily have to focus solely on the sounds.⁹

Cook alludes to a certain ethnocentricity in Western or Westernized listeners and hints strongly that this ethnocentricity has heavy overtones which emanate from the APV. He claims that "to approach music aesthetically is to interpret it in terms of a specific interest in sound and its perceptual experience is not, then, to transcend Western cultural values, but rather to *express* them" (Cook, 1990: p. 7, my italics).¹⁰ Cook reinforces this argument when he states that the Western musical 'aesthetic' has become one "which is essentially consumer oriented in that music is treated as a kind of commodity whose value is realized in the gratification of the listener...it leads to an unbalanced interpretation, if not downright misinterpretation of ritual, religious, and easy-listening music—all of which is intended not so much to be listened to, as to be experienced within a larger social context from which they derive much of their significance" (Cook, 1990: p. 7). In the next section, I shall provide a more detailed definition of the APV.

2.2.3 The aesthetic point of view defined

Before defining the APV, some preliminary remarks are in order. The first point of note is that it is a necessary condition of the APV to consider music as a collection of 'aesthetic objects.' The corollary to that point is that aesthetic objects must, by definition, be considered from the APV. That may seem obvious and even circular, but the act of adopting the APV in itself implies a rejection (at least temporarily) of other points of view from which to consider

^{9.} A counterreply to the above examples might be that a Westerner has every right to perceive *kalimba* and *qin* as purely musical idioms. I would not disagree with that point. However, I do take issue with CTM which claims that the cognition of such forms as *kalimba* and *qin* 'as music' is natural, involuntary, mandatory and is an innately human attribute.

^{10.} I extend Cook's contention to include CTM, which, in my view, does not effectively transcend Western cultural values (i.e., does not promote explanations of universal musical cognitive processes and structures), but rather simply *expresses* them as well.

music.¹¹ I have included the provision, 'at least temporarily,' because one of the central issues in philosophical debates about the APV concerns whether the APV is an ontological as opposed to a theoretical issue. For those who espouse aesthetic perception as the basis for truth about the cognition of objects of art, the APV is presumed to be an ontological matter. On the other hand, if the APV were interpreted as a theory, and not ontologically, it would make room for a variety of stances (aesthetic and/or nonaesthetic) that might be instrumental in understanding the formal elements of a musical work. For instance, if one were to adopt a conceptual point of view (i.e., a non-APV view) concerning the apprehension of a piece of music or a musical process, it might imply that a work could be approached for the purposes of apprehending the essential features of its conceptual underlay, such as certain compositionally motivated mathematical or structural factors. By treating a variety of points of view as theoretical matters (and not in terms of ontology), multiple points of view could be adopted concurrently, including the APV itself.

With the above considerations in hand, let us be more specific in terms of defining the APV. As has been said earlier, to approach a work of art from the APV is to consider it strictly in terms of perception. Monroe Beardsley states that "a work of art (in the broad sense) is any perceptual or intentional object that is *deliberately* regarded from the aesthetic point of view" (Beardsley, 1970, in Margolis, ed., 1987: p. 13, my italics). Beardsley offers what he calls a 'capacity-definition' for an aesthetic point of view (broadly conceived). He states that adopting an aesthetic point of view (broadly conceived) can amount to taking "an interest in whatever aesthetic value X may possess" (Beardsley, 1987: p. 13). Thus, to adopt an aesthetic point of view (broadly conceived) in terms of a capacity-definition, one searches for value in any object, artwork or otherwise, by means of whatever is obtainable solely through perceptual processes.

^{11.} Recall that CTM claims that the APV is not adopted, but is naturally instantiated in the mental apparatus for cognizing music.

In his book, *Normative Discourse*, Paul Taylor makes a pertinent point concerning the notion, 'point of view.' He contends that

taking a certain point of view is nothing but adopting certain canons of reasoning as the framework within which value judgments are to be justified; the canons of reasoning define the point of view...We have already said that a value judgment is a moral judgment if it is made from a moral point of view. (Taylor, 1961: p. 109)

It might follow from the above that a value judgment is an aesthetic judgment if it is made from an aesthetic point of view. In order to avoid the trap of a circular argument, one would first have to define the term 'aesthetic value.' Beardsley defines aesthetic value as "the value [an object] possesses in virtue of its capacity to provide aesthetic gratification" (Beardsley, 1987: p. 15). Again, in order to avoid circularity, we now need to form a definition for 'aesthetic gratification.' Gratification normally implies pleasure taken in or from something. What then, is 'aesthetic gratification'? Beardsley states that "gratification is aesthetic when it is obtained primarily from attention to the formal unity and/or the regional qualities of a complex whole, and when its magnitude is a function of the degree of formal unity and/or the intensity of regional quality" (Beardsley, 1987: p. 16).¹²

Beardsley maintains that aesthetic gratification is preeminently connected with works of art, including poems, plays, musical compositions, etc. The question arises as to what are the primary 'marks' of the aesthetic which contribute to the categorization of the above list of items *as* works of art. Beardsley states that "it is the presence in the object of some notable degree of unity and/or the presence of some notable intensity of regional quality that indicates that the enjoyments or satisfactions it affords are aesthetic—insofar as those enjoyments or satisfactions are afforded by these properties" (Beardsley, 1987: p. 16). To help with the above, let us return to Beardsley's intention to employ a 'capacity-definition' for aesthetic value. He warns that he does not mean to imply that the aesthetic value of an object is a function of the actual

^{12.} Beardsley's contribution, in the above quote, will figure somewhat prominently throughout this study when speaking of the formalist underpinnings to the APV, especially as it concerns CTM.

total degree of gratification derived from it over number of exposures, but it is rather to be thought of in terms of the degree of gratification the object can provide on each exposure. Thus, Beardsley supplements the above definition with one which states that "the amount of aesthetic value possessed by an object is a function of the degree of aesthetic gratification it is capable of providing in a particular experience of it" (Beardsley, 1987: p. 17).

Beardsley warns that there are three potential weaknesses with a 'capacity-definition': first, what he calls the "unrecognized masterpiece problem" or, the "problem of falsification"; second, the "problem of illusion"; and third, the "problem of devaluation" (Beardsley, 1987: p. 18). The problem of falsification implies that, for one reason or another, a work may not readily exhibit its aesthetic capacities, because its features are too obscure to be observed fully. The second problem, that of illusion, implies that the capacity for proper aesthetic gratification may be impinged upon by an experiencer's unstable state of mind. Thus, Beardsley amends his definition of aesthetic value to say that "the aesthetic value of X is the value that X possesses in virtue of its capacity to provide aesthetic gratification when correctly experienced" (Beardsley, 1987: p. 19, Beardsley's italics). Beardsley explains the third problem, that of devaluation, as that which occurs when an experiencer judges a work by inappropriate criteria, such as when a youngster judges a song highly on the basis of peer pressure rather than on the merits of the formal unity or regional intensities of the song itself. The former, in terms of the APV, would be considered to be a 'nonaesthetic' judgment, and on that basis alone would be considered a 'devalued,' or even a valueless construal of a work. Thus, Beardsley amends his definition of aesthetic value further in stating that "the aesthetic value of X is the value that X possesses in virtue of its capacity to provide aesthetic gratification when correctly and completely experienced" (Beardsley, 1987: p. 20, Beardsley's italics).

As mentioned earlier, the APV presumes the exclusion of other points of view in approaching a work of art. Beardsley states that "a consideration about an object is relevant to the aesthetic point of view if and only if it is a fact about the object that affects the degree to which the marks of aesthetic gratification (formal unity and intensity of regional quality) are present in the object" (Beardsley, 1987: p. 21). Thus, the circumstances of a composer's life at the time of composing a work, the title, whether it is a forgery, etc., are all taken to be 'non-aesthetic' considerations and do not impinge on an assessment of the aesthetic value of a musical work. Beardsley states that, according to the conditions imposed by the APV, any one of the above mentioned factors may be "a condition of appreciation [but]...not necessarily a condition of value" (Beardsley, 1987: p. 22), and it is value with which the APV is primarily concerned.

One of the tasks of this study is to debate the merits and/or demerits of the APV.¹³ However, one of the more important purposes of this study is to examine how the APV impinges on the *formulation* of CTM. I have been discussing the APV in terms of how the aesthetic object provides aesthetic gratification to the subject. This point of view, however, is somewhat contrary to the internalist agenda of CTM, which takes its view from the subject (i.e., the cognizing individual who mentally constructs the object), not the aesthetic object itself. According to CTM, it is the subject who constructs mental representations of the musical object and thence assesses the value of said representations. In terms of CTM, these representations are created through natural processes, by means of unconscious mental structures referred to specifically by Harold Fiske as the 'aesthetic attitudes.' In the next section, I shall explore this issue in terms of how the APV relates to CTM.

2.3 The aesthetic point of view and cognitivist theory of music

2.3.1 Subjective versus rational judgment

A significant portion of debate in contemporary cognitive science is devoted to a concern about the causal source of cognitive modalities. Concerning the cognition of works of musical art, it is often discussed whether the cognition of a musical work is mostly a factor of subjective

^{13.} I shall, however, make some remarks concerning the APV and its relation to music education in Chapter 10, especially as it relates to the practical applications of APV-based CTM.

and largely unconscious causes (described by Baumgarten as the 'faculty of taste') or whether it is the result of conscious, rational decision making. The split between the two views impinges on the direction taken by CTM. If the former view is upheld, it is generally presumed that judgments are the result of causally instantiated mental processes not available to introspection. If the latter is the route to take, then it might be presumed that conscious processes have the potential to figure prominently in musical judgment, perhaps having the power to override so-called subjective processes.¹⁴

Susanne Langer and Clive Bell throw some light on the issue. They hypothesize the existence of a phenomenon called the 'aesthetic emotion,' which they both variously describe as arising from a rationally-based contemplation of objects of art. Bell's notion of 'significant form' is in effect an explanation of the role of perception as a means to the arousal of the so-called 'aesthetic emotion.' In *Feeling and Form*, Langer calls aesthetic appearances 'semblances,' which she interprets as artistic 'illusions' which present themselves to the observer.

In Analysis and Value Judgment, Dahlhaus sheds a different light on the longstanding controversy over the validity of subjective and rational aesthetic judgments. He distinguishes subjective from rational aesthetic judgments by saying that historically, subjective aesthetic judgments of artistic value generally imply a certain predominance of 'taste.' He states that other contributing factors of aesthetic judgment rely more upon reflective, rational or analytical powers. Dahlhaus says that "individual particular taste, which is in general not at all individual but rather a reflex of group norms, appears as the highest authority against which there is no appeal...[a]rguments based on objective facts become suspect as offering not a foundation but merely an illustration of aesthetic judgment, which passes for one of feeling. Rationality appears as a secondary factor, as an addition or decoration" (Dahlhaus, 1983: p. 3). According to

^{14.} I have used the terms, 'subjective' and 'rational' in my title, because other terms seem to cause confusion rather than clarity. Dichotomized terminology such as 'subjective-objective' seems to fail to capture the notion of rationality in the term, 'objective.' On the other hand, a 'irrational-rational' dichotomy fails to capture the notion of subjectivity in the term, 'irrational.'

Dahlhaus, it would seem on first glance that the notion of 'taste' is more fundamental to aesthetic judgment than rationality. However, if 'taste' is a reflex (read as involuntary) of group norms, the question arises how group norms of taste become instantiated in the individual. The explanation from the APV states that taste arises through a series of perceptually-based exposures to a given idiom. In fact, Lerdahl and Jackendoff (1983) premise their theory of music cognition on that very argument.

I shall argue that historically, music cognition theory has been very much founded upon the above perspective, that is, of the predominance of the subjective over rational judgment. This is in the sense that the music listener is generally deemed to have little conscious (i.e., rational) control over the apprehension of the musical object (and all the entailments of judgment that follow). On one hand, Dahlhaus argues that subjective aesthetic judgment provides "the psychological premise and point of departure for the discovery of rational explanations" (Dahlhaus, 1983: p. 3). However, Dahlhaus warns the reader that "one must distinguish the origin, the genesis, of an aesthetic judgment from its legitimation" (Dahlhaus, 1983: p. 3). In other words, subjective aesthetic judgment (i.e., simply reacting to music without employing reflective judgment) may not necessarily forestall the legitimacy of rational judgment nor does subjectivity alone provide a sufficient basis for making completely valid aesthetic judgments.

Dahlhaus notes that musical experiences early in one's life, albeit not directed consciously, certainly do form a powerful basis for later musical judgment. This is especially pertinent to and supportive of CTM, which endeavours to explain the real effects of music cognition as being fundamentally the result of unconscious processes initiated by the accumulation of musical listening experiences. In the happiest of cases, Dahlhaus says, rational justification for one's early musical impressions are not just 'add ons' or just pseudo-psychological explanations, but rather a justifiable way of "return[ing] to its premises" (Dahlhaus, 1983: p. 4). However, and pertinent to my argument, Dahlhaus warns the reader that the resistance (of those promoting the primacy of subjective judgment) to any acceptance of the role of rational

judgment as a way of making valid aesthetic judgments is largely based on the unfounded contention that one's first impressions will be somehow illegitimized in the process. As I shall indicate later, music cognition theorists such as Lehrdahl and Jackendoff (1983) and Fiske (1990) go one step further by claiming that rational judgment *cannot* impinge upon one's earlier impressions. Their arguments are based on the premise that the hardwiring of the psychological apparatus for music cognition prevents any such occurrence.¹⁵

Dahlhaus notes that the resistance to the serious acceptance of the role of rational judgment in music cognition is borne of an historical attitude. He points out that those who dictated the concept of artistic taste in the seventeenth and eighteenth centuries were resistant to the admission of rationality as a potential source of aesthetic judgment. There may have been political reasons for such thinking. The so-called 'faculty of taste' (i.e., aesthetic judgment) became an instrument to serve the social power structures of the time. According to Dahlhaus, taste was avowed as a natural quality, implied to be held only by those of a certain elevated social status, and not possessed by people in the lower classes. Dahlhaus says that taste was

an aristocratic category: taste was a social privilege which one did not promote rationally but asserted irrationally...inasmuch as suspicion of rationality in aesthetics is an aristocratic or pseudo-aristocratic relic—a piece of the past in the thought of the present—it need not be accepted as if it were objectively founded; it can be suspended or even turned into its opposite: suspicion of aesthetic irrational-ity" (Dahlhaus, 1983: p. 4).

This argument may in fact mark the beginnings of CTM's hypothesis for the naturalization of the APV. The naturalized form of the APV is sometimes referred to in music cognition theoretical writings as the 'aesthetic attitudes.'¹⁶ I shall pursue this point in more detail in Chapter 10, in which I set out my positive thesis and offer suggestions for an alternative approach to the formulation of music cognition theory.

^{15.} See Chapters 6 and 8 for detailed discussion of this issue.

^{16.} In Chapter 8, I discuss in detail Fiske's proposal for a naturalized set of aesthetic attitudes.

As alluded to earlier, one of the prerequisites of CTM is the criterion of audibility. Dahlhaus questions those who maintain that the criterion of audibility is the sole means of assessing aesthetic validity. Dahlhaus contextualizes this argument when he states that

the aesthetic disdain of "superfluous intentions" not "realized" in the perceptible shape of a work originated in the polemics of classicism against mannered and baroque art...an undogmatic theory of art must recognize that the criterion of audibility, of complete realization by perception, is not a natural law of aesthetics but a postulate of historically limited scope. By rigorously restricting the concept of music or of "music proper" to the perceptible, one curtails historic reality for the sake of a dogma not older than the eighteenth century" (Dahlhaus, 1983: p. 54).

The above point is particularly pertinent to CTM, which is so heavily founded upon the audibility criterion. As I understand it, the principal task of CTM is to describe the listener's (subjective) cognitive constructions of what (s)he has heard. If Dahlhaus is right in saying that the criterion of audibility is a social convention rather than a factual or natural reality, then there may strong reason to question the external validity of CTM where it concerns the audibility criterion. If the audibility criterion arises as a highly contextualized notion, premised as it is upon the social and class-oriented values of the eighteenth century (which Dahlhaus calls into question), then it also must follow that the premises of CTM theory-making are the result of a similar cultural indexing. This, of course, must result in a questioning of the external (i.e., universal) validity of such theory-making.

2.4 Concluding remarks

Under the conditions set by the APV, the ontological setting for things 'musical' establishes clear-cut boundaries, eliminating as 'nonmusical' all features of the experience of music not covered by the audibility criterion. Thus, for models of music cognition theory following this line of argument, it is but a small step to naturalizing the APV, described in cognitivist terms as the 'aesthetic attitudes.'

In the next chapter, I shall introduce the second thrust of my argument—the relation of the manifest and scientific images to CTM. In doing so, I shall endeavour to demonstrate that the naturalizing of the APV results in a misconceived transformation of what was originally a theoretical concept (i.e., historically and culturally situated) into an ontological concept (i.e., naturally and universally situated).

Chapter 3

The Manifest and Scientific Images

3.1 Introduction

The focus of this chapter is to examine critically the idea, generally accepted in CTM, that the manifest image of music supervenes upon the scientific image of music. In other words, CTM, as a scientific pursuit, premises its claims on the idea that music, inasmuch as it is a cultural phenomenon, is caused by cognitive processes which are best explained scientifically. My claim is the reverse: that is, that since scientific explanations of music are rooted in music's cultural manifestations, the categories of the scientific image of music are logically dependent upon and expressed in terms of the categories of the manifest image of music. For instance, formal musical structures, tonal-rhythmic patterns, etc., (i.e., manifest-image items) actually go great distance in providing the descriptive categories for hypothesized cognitive processes.

The notions of supervenience and the manifest/scientific image dichotomy have not found their way (at this writing) into regular usage in discussions concerning music cognition. In this chapter, I propose to articulate the general notion of supervenience and then as it pertains specifically to CTM. In terms of explaining the manifest/scientific image dichotomy in music, I shall relate the present problem to Garfield's (1988) and Sellars' (1960) recommendations for embracing the two images within general psychological theory and then I shall particularize their solutions in relation to CTM.

In his 1988 book, *Belief in Psychology: a study in the ontology of mind*, Jay Garfield proposes an alternative view to the individualistic and physicalistic ontology of orthodox cognitive science in which cognition (that is, the mind) is viewed to be supervenient upon the physical/biological brain. Garfield's alternative suggestion is that the mind, being made up of cognitive structures and processes, is supervenient upon a large and irregular environment which includes the brain as a part of that environment. Garfield arrives at his alternative view partly through an examination of Wilfred Sellars' (1960) account of two concepts referred to as the 'manifest image of man-in-the-world' and the 'scientific image of man-in-the-world.'
I shall begin the discussion with a short definition of supervenience. I shall then examine Garfield's particular approach to supervenience, after which I shall indicate how Garfield's and Sellars' ideas relate to CTM.¹ Suffice it to say for now that CTM generally leans towards the traditional (i.e., scientific) notion of supervenience. That is, following the cognitivist (i.e., scientist) line of argument, contemporary cognitivist models of music cognition are founded on the premise that the activity of music cognition supervenes upon the physical brain. Within the conceptual frameworks of such models, the manifest image of music (music understood as a cultural phenomenon) is ontologically at source a mentally constructed phenomenon. In other words, on the scientific supervenience model, the internal activity of music cognition is claimed to be prior to its cultural manifestations.

3.2 Supervenience

In cognitive science circles, the generally accepted explanation for supervenience is that the mental character of something or someone is totally determined by its or his or her physical nature. For this reason, supervenience, as defined, is a foundational concept in physicalist or materialist theory of mind. Three ideas have come to be associated with the notion of supervenience. These are listed and defined below:

1) *Property covariation*: if two things are identical in all respects in terms of their base properties, it is said that they must also be identical in terms of their supervenient properties.

2) *Dependence*: supervenient properties are said to be determined by and dependent upon their base properties.

3) *Non-reducibility*: 1) and 2) can obtain even if supervenient properties cannot be reduced (and, according to the supervenience hypothesis, they *cannot* be reduced) to their base (subvenient) properties. (Summarized from Kim, J., *Supervenience*, in Guttenplan, 1994: pp. 575-583)

^{1.} In later chapters, I shall discuss in more detail the relation of the manifest/scientific image dichotomy to CTM as it pertains to each theoretical model.

3.3 The manifest and the scientific images

Garfield's argument for an alternate view of supervenience (explained shortly) is based on a distinction Sellars (1960) made between what he called the manifest image of man-in-theworld and the scientific image of man-in-the-world (which I shorten to the 'manifest image' and the 'scientific image').² Sellars defines the manifest image as "the framework in terms of which man came to be aware of himself as man-in-the-world" (Sellars, 1963: p. 6).³ The manifest image has two aspects. In its first aspect, Garfield characterizes the manifest image as "the image in which persons locate themselves as persons, and which determines the conceptual structure in which persons conceptualize themselves and the world in which they find themselves" (Garfield, 1988: p. 14). The second aspect of the manifest image identifies its specific content. To begin a discussion of the notion of content, Sellars explains that in terms of the manifest image, the issue of content is best exposed when we attempt to answer the question: "What are the basic objects of the manifest image?' when we say that it includes persons, animals, lower forms of life and 'merely material' things like rivers and stones" (Sellars, 1960: p. 9). Sellars states that the manifest image is not an image in which the world manifests itself to us in a passive sense, but is rather a double-aspect image in which we as humans actively represent the day-to-day world. It is a world in which we, as persons (the first aspect), are surrounded by the objects of our day-to-day existence (the second aspect), that is, the chairs, tables, animals, etc., that are the objects of our everyday ontology.

Garfield suggests (contrary to the orthodoxy of cognitive science) that the manifest image is, by necessity, prior to the scientific image. In alluding to the double-aspect nature of the manifest image, Garfield states that the "conceptual resources required to represent the objects and relations of the manifest image are those embedded in our cultures and our languages"

^{2.} Garfield makes valuable contributions to Sellars' discussion on the manifest/scientific image dichotomy. Throughout the ensuing discussion, I shall range back and forth between Garfield's and Sellars' comments on the matter.

^{3.} My references from Sellars come from his 1963 book, which includes as the first chapter, the original 1960 article.

(Garfield, 1988: p. 15). In other words, the concepts and means available to humans for explaining the world are irrevocably tied to their culture and thus to the world as it manifests itself to them. Garfield claims that we learn about the ontology of our culture (and the manifest image of ourselves) through our language.⁴ Sellars states that "the manifest image must, therefore, be construed as containing a conception of itself as a group phenomenon, the group mediating between the individual and the intelligible order" (Sellars, 1963: pp. 16-17). Garfield explains further that "it is only by participating in the manifest image as a member of a group, as a follower of linguistic and epistemic rules, and hence as a person that one can engage in the sophisticated representational activity, hypothesis construction, and theorizing that makes science and hence the scientific image possible" (Garfield, 1988: p. 16). On this account therefore, the manifest image is to be understood as conceptually as well as ontologically prior to the scientific image.⁵

Sellars argues that the scientific image cannot properly be explained in terms of the conceptual and temporal ontology of the manifest image, that is, the world of persons and midsized objects. Garfield further explains that the scientific image is "the image of the world that includes...the theoretical entities—particles, forces, magnitudes, and quantitative relationships—that theoretical science employs to, in part, explain the nature and behavior of the objects in the manifest image" (Garfield, 1988: 16). According to Sellars, the scientific image is both complex and evolving because it is composed of a profusion of individual sciences which taken together, present a kaleidoscopic image of the world. The evolutionary process of the scientific image is said to be progressive, as more and more phenomena are explained in its

^{4.} In my view, that point is debatable, but a discussion taken in that direction is outside the parameters of this study. However, to illustrate my point, humans learn much about the world that is pre-linguistic and also specifically non-linguistic, such as through certain semiotic relationships which may be outside the linguistic domain.

^{5.} The goal in eliminativist theories such as Churchland's (1979) is to do away with the manifest image altogether. Churchland argues that someday it may be the case that people will relate to the world purely in terms of the scientific image because as science further articulates the world, the terms of the scientific image will eventually replace the terms of the manifest image.

terms. However, Sellars notes that the state of flux of the scientific image at any point in time is always matched by a concurrent and concomitant state of flux in the manifest image, partly caused by the infusion of the effects of the scientific image into popular (manifest) culture. A striking example of this point is illustrated in terms of the change which occurred in the manifest image of the relation of the earth to the sun and stars after Copernicus discovered that the earth rotates around the sun within a relatively stationary stellar background. This example is indicative that scientific discoveries eventually find their way into manifest-image (everyday) parlance.

Sellars observes that the two images have an uneasy relation because "each theoretical [scientific] image is a construction on a foundation provided by the manifest image, and *in this methodological sense* presupposes the manifest image, mak[ing] it tempting to suppose that the manifest image is prior in a *substantive* sense; that the categories of a theoretical science are logically dependent on categories...in the manifest world" (Sellars, 1963: p. 20, his italics). However, in setting itself up in a dichotomized relation to the manifest image, the scientific image purports to be (if not at least promising to provide sometime in the future) a complete image of the truth of the world, eventually rendering the manifest image on which it rests is an 'inadequate' but pragmatically useful likeness of a reality which first finds its adequate... image in the scientific image...to all which, of course, the manifest image, or, more accurately, the perennial philosophy which endorses its claims, replies that the scientific image cannot replace the manifest image without rejecting its own foundation" (Sellars, 1963: pp. 20-21).

In terms of the above statement, we have a situation in which the two images are not only competing, but also that the manifest image is in a state of threat by the supremacist tendencies of those who promote the scientific image. What comes to us as a commonsense view of the world (i.e., the manifest image) is being gradually replaced by a view (i.e., the scientific image) which purports to explain the world as it 'really' is, not as it appears. In terms of its supremacist tendencies, Garfield states that "the scientific image...claims for itself not so much plasticity as evolutionary convergence to the truth. On this account, the manifest/scientific distinction is tantamount to, or at least approaching, the classical appearance/reality distinction" (Garfield, 1988: p. 17).

Garfield attributes this apparent clash between the two images to three possible causes. First, the categories in terms of which the scientific image describes itself (i.e., objects, forces, actions, relations, properties) are actually the categories we initially use in expressing the manifest image, extended and refined. To understand and use those categories in terms of the scientific image, Garfield says it is normal (and probably necessary) first to conceptualize those categories and second, to use them in terms of the manifest image. In doing so, the scientific image, in attempting to arrive at a more sophisticated description of the world, cannot relinquish, deny or take sole ownership of those categories. Second, according to Garfield, the phenomenal world of the manifest image is the world in which we are forced to live and therefore we tend to *adopt* aspects of the scientific image in our language in order to provide us with refinements of our understanding of the manifest world. As such, the manifest image provides the pursuit of the scientific image with its very impetus and meaningfulness as an activity. Garfield points out that the third (and most important) explanation for the clash between the manifest and the scientific images has to do with the notion of persons. As the scientific image becomes further articulated, there is a progressive depersonalization from the original image (that is, the personal, subjective aspect) to the objective aspect of the manifest image, leading finally to a totally depersonalized scientific image (of man-in-the-world). Garfield says that the concept of a person is

the concept of a thing that, at least, conforms its cognitive and linguistic behavior, and its other social behavior as well, to rules, and does so in the context of a community that is capable of articulating and enforcing those rules. A central feature of persons, then, is the normative character of the predicables appropriate to them, and it is of the essence of the scientific image that its predicables are descriptive rather than normative. (Garfield, 1988: p. 18)⁶

^{6.} Detractors to this view might argue that the scientific image is as much rule-based in its own way as the manifest image is in *its* own way. I would defend Garfield's argument by pointing out that in terms of the scientific image, rules tend to evolve from induction but in terms of the manifest image, the person generally encounters rules

Garfield sets out four potential ways to resolving the conflict between the manifest and scientific images. The first possible resolution is that the scientific image could supercede and make redundant the manifest image (as expressed in Churchland's 1979 argument). Garfield refers to this as the 'scientist' view. Second, the manifest image could win out, relegating the scientific image to an instrumentalist role in providing explanations for the manifest image. Garfield refers to this as the 'instrumentalist' view.⁷ A third possible resolution is that both images could be retained, but kept distinct, giving us what Garfield refers to as the 'binocular' view.⁸ The fourth possible solution to the manifest/scientific image dichotomy would be to synthesize the two images, providing us with an explanation of the world which retains the best features of both images. Garfield refers to this as the 'synthetic' view in the next section.

3.3.1 The synthetic view

The essence of Sellars' synthesis argument is that the understanding of the manifest image with all its normative properties is in reality embedded in the scientific image. Sellars achieves synthesis of the two images by arguing that belief states in the manifest image (scientifically explained) are to be identified with neurophysiological states. More specifically, Sellars argues that a thought *x* is a psychological state in the subject's internal psychological economy which has a parallel function in natural language. In other words, those parallel states (that is, the manifest belief and the internal psychological state scientifically described) are

- 8. This is Garfield's preferred version.
- 9. Sellars argues for this version.

already formulated by the community. Perhaps it is in this way that Garfield is correct in claiming that the predicables of the scientific image are descriptive and the predicables of the manifest image are normative.

^{7.} The instrumentalist solution is probably the least desirable because the status of the scientific image is too central to our contemporary understanding of the world for it to be relegated to the sidelines.

functional equivalents, or, as Garfield explains, they are "events in the central nervous system described in the language of neurophysiology" (Garfield, 1988: p. 19). Sellars' synthesis theory concludes that once individual thoughts, intentions, beliefs, etc., are understood in terms of neurophysiology, a theory of the norms and intentions of the community and hence personhood can be developed. This move then opens an avenue of approach for the accommodation of the manifest image of persons within the scientific image of things. Garfield explains that "in such a synthesis, beings can be understood to possess normative properties in virtue of their naturalistic relations to naturalistically characterized community intentions" (Garfield, 1988: pp. 19-20).

In order to bring the above presentation into the perspective of this study, it might be said that a roughly similar version of the 'synthetic' solution is most often favoured by CTM. In other words, music, taken as a cultural phenomenon, including its practices, works, and individualized thoughts about it by persons, is to be understood and explained in terms of individualized neurophysiological processes. As the favoured orthodoxy expressed in terms of CTM, the scientific image is always taken as primary. That is, musical participants (manifestly conceived) are accounted for by the understanding that the normative properties of musical idioms (and consequently, the musical beliefs of individual music cognizers) and the conceiving of said properties are embedded in the scientific image. The mediating link between the manifest beliefs of individual music participants and the concomitant scientific explanation of those beliefs is that such beliefs (manifestly conceived) are enfolded into the scientific image by identifying them fundamentally as neurophysiological states. In other words, the cognitivist story states that the manifest beliefs of individual music cognizers supervene upon the neurophysiological states in which they are instantiated.

To bring this idea into a more general perspective, Garfield outlines three essential components in the Sellarsian 'synthesis' thesis of linguistic meaning and of the linguistic model of mental events.¹⁰ First, there is the functional component. Garfield explains that "the meaning of linguistic items is to be understood in terms of the functional roles they play in linguistic

^{10.} Extracted from Sellars, 1956, 1974, 1980, and 1981.

practice" (Garfield, 1988: p. 19). For example, there is a logical relation where the term 'boat' in English means 'bateau' in French. This relation is analyzed in the postulation, "'boat' is a 'bateau'" and thus, 'bateau' is understood as an expression that plays the same functional role in French as the expression 'boat' plays in English.

In relating the above to music, the argument would follow that the meaning of musical items (i.e., phrases, patterns, chord progressions, etc.) is to be understood in terms of the functional roles those items play in musical practice.¹¹ It is often expressed that there are many musical languages, which is another way of saying 'musical idioms.' Therefore, the cross-modal musical equivalent of a natural language might then be referred to as a musical idiom. For example, the chord progression, IV-V⁷-I in common practice harmony would be taken to *mean* (i.e., is functionally equivalent to) II^{min7}-V⁹-I^{maj7} in jazz harmony and thus would follow that the chord progression, II^{min7}-V⁹-I^{maj7} plays the same functional role in jazz harmony as the chord progression, IV-V⁷-I plays in common practice harmony.

The second component in the Sellarsian 'synthetic' account represents another aspect of the functionality of statements and psychological states. Garfield explains that "a thought [e.g., that the cat is on the mat]...just is some psychological state that is a ['cat-on-the-mat' thought], that is, that plays the same role in the subject's internal psychological economy that...[the statement 'the cat is on the mat'] plays in natural language" (Garfield, 1988: p. 19).¹²

In terms of music, the Sellarsian synthetic story would follow a line that a thought 'that II^{min7}-V⁹-I^{maj7}' is just some psychological state that is a 'II^{min7}-V⁹-I^{maj7}' thought, and thus, the mental entity represented by 'II^{min7}-V⁹-I^{maj7}' as a psychological state plays the same functional role in music cognition as it does in the jazz idiom.

^{11.} The term 'meaning' is to be understood in the context of the APV, as a special condition taking into account the perception of the formal properties of musical items.

^{12.} In the hope of adding clarity, I have substituted Garfield's use of symbols in his text with the example, 'cat on the mat.'

The third component in the Sellarsian 'synthetic' account is yet another aspect of the functionalist explanation. Garfield explains that "the states that are the candidates in the scientific image for the functional equivalents in the internal psychological economies of believers of linguistic items in public language are events in the central nervous system described in the language of neurophysiology" (Garfield, 1988: p. 19). Translating the above into a linguistic example, it might be said that 'cat-on-the-mat' thoughts (as psychological functional equivalents of 'cat-on-the-mat' statements), are to be understood as events in the nervous system, neurophysiologically described.

In terms of music, an explanation of the third component in the Sellarsian 'synthesis' account might be that 'II⁷-V⁹-I^{7'} thoughts (as expressed in the scientific image) that are the functional equivalents of 'II⁷-V⁹-I^{7'} chord progressions in jazz harmony (as expressed in the manifest image) are to be understood, in Garfield's words, as "events in the central nervous system as described in the language of neurophysiology" (Garfield, 1988: p. 19). This last point brings to the fore the issue of supervenience: *x* psychological states are said to supervene on *x* biological states, and *x* manifestations of *x* psychological states are said to supervene on *x* psychological states. Garfield states that once the above idea is incorporated, it follows (on the Sellarsian synthetic model) that

an account of the rules and norms the applicability of which is definitive of personhood, can be developed. Hence, the argument concludes, the framework of persons, the manifest image, need not be jettisoned but can be accommodated within the scientific image. In such a synthesis, beings can be understood to possess normative properties in virtue of their naturalistic relations to naturalistically characterized community intentions. (Garfield, 1988: pp. 19-20)

Garfield rejects the Sellarsian 'synthetic' account on two points. First, he disagrees with the notion of identifying neurophysiological phenomena as functionally equivalent tokens of publicly linguistic items. Second, Garfield stipulates that he is arguing "for an account whereby the manifest image and the scientific image stand as mutually necessary but distinct lenses through which we represent the world. I will embrace...a psychology that does justice to the PAs [which] will of necessity be one that takes seriously the normative embedding of persons in their communities" (Garfield, 1988: p. 20).¹³

3.3.2 The binocular view

Garfield argues that Sellars' 'synthetic' solution to the manifest/scientific image dichotomy is ultimately mistaken. He states that the manifest image, "while indeed sharing certain key features with the scientific image, retains an independence of method and an independence of ontology that require the predicates applicable to persons to be treated somewhat specially" (Garfield, 1988: p. 24). Garfield argues that meaningfulness and attention to communal norms of language and mental phenomena presuppose the very construction of the scientific image. He further argues that "given the nature of the domain of psychology, the ontology of the manifest image places special constraints on its [psychology's] theoretical entities and its methodology" (Garfield, 1988: p. 24). These constraints are due to the preoccupation of the manifest image with persons embedded within the cultures that construct the manifest image itself. Garfield states that these constraints "issue in the incoherence of any account that either denies the existence of [intentional states] or does serious violence to their relational, intentional character and to their kinship with linguistic states" (Garfield, 1988: p. 8).

Garfield proposes a shift in the consideration of representational phenomena from a supervenience base of individualized cognitive systems to a "large, irregular supervenience base" (Garfield, 1988: p. 131, 144, et al) which assumes that language is prior to propositional attitudes and which "locates one in a complex, indefinite network of relations to one's environment and one's cultural and linguistic community" (Garfield, 1988: p. 132). To this end, Garfield states that

^{13.} The PAs are identified as the so-called 'propositional attitudes,' which in cognitive science orthodoxy include notions of mentality such as belief, desire, intention, hope, fear, wish, etc.

the ontological story is more complex, however. Although animal representation systems are necessary preconditions of the acquisition of language, the possession of PAs (propositional attitudes) is not. To be in a representational state is, from an ontological perspective, to be in a complex set of relations to one's history and environment, and this is so whether the representational state in question is a state of a map, of the ink on this page, of a gerbil, of a computing machine, of an infant, or of an adult human believer. (Garfield 1988, p. 142)

In terms of CTM, my resolution of the dichotomy of the manifest and scientific images would be similar to the 'binocular' approach proposed by Garfield with one specific alteration (which I shall explain shortly). I agree with Garfield that the scientific and the manifest images of music are distinct lenses through which to formulate a picture of how we mentally represent the world of music. Garfield cautions his reader that his intention (as mine) is not to prescribe a wholesale change in the general direction of psychological research, but rather to recommend a "reconceptualization of the enterprise" (Garfield, 1988: p. 8). CTM customarily assumes a supervenience base in terms of the primacy of the scientific image and all that taking such a position entails. I contend that the concepts and categories of music cognition (scientifically described) are in themselves established and described in terms of the manifest image of music, which points to the primacy of the manifest image of music.

However, the image (manifestly described) to which CTM adheres is itself based on a very particularized ontology, being derived from the APV. I contend that such a particularized manifest image of music is a symptomatic fault in the conceptualization of the CTM enterprise. This becomes essentially a question of domain demarcation, a point which I shall pursue in more detail shortly. My principal complaint with individualistic (i.e., internalistic) supervenience models of music cognition is that they tend to deal with only the formal mental structures arising from the perception of musical material within the auditory-cognitive domain. One negative consequence of seriously considering such models is that it excludes or does not account for an explanation of important and inescapable pragmatic, or goal-driven contexts. Holland, et al (1986) raise this point in terms of the 'pragmatic' as opposed to the 'syntactic' character of induction. Holland (et al) state that

because of its emphasis on the role of the system's goals and the context in which induction takes place, we characterize the theory proposed here as *pragmatic*. In contrast, most treatments of the topic have looked at purely *syntactic* aspects of induction, considering only the formal structure of the knowledge to be expanded and leaving the pragmatic aspects, those concerned with goals and problemsolving contexts, to look out for themselves. In our view, this stance has produced little insight into the way humans do, or efficient machines might, make just the inferences that are most useful. That is not to say that syntactic considerations are irrelevant; indeed, at some level they are inescapable in any computational system. Our claim is that pragmatic considerations are equally inescapable. (Holland, J. H., K. J. Holyoak, R. E. Nesbett, and P. R. Thagard 1986: p. 5)

In my view, it is the inclusion of pragmatic considerations, or goal-driven contexts that will do much to incorporate the notion of person into a revised conceptualization of music cognition theory. However, the ontology of APV-based music cognition theories view pragmatic or goal-driven contexts to be categorized as 'extramusical' and thus outside the parameters for study. As will become evident in my detailed investigation in Chapters 5 through 8, the focus of CTM is concerned with the syntactic aspects of induction.

Given that the research effort in CTM is made on the premises of the APV, its commensurate external validity is in danger of being severely restricted or even threatened due to the narrow (syntactic) view of music it presupposes and also due to the subsequently assumed syntactic nature of musical cognitive processes. In other words, the results of the CTM effort, while not necessarily misconceived, are rather too narrowly conceived, and in my view, run the risk of being considered as little more than a special kind of aural-domain type of cognition. Therefore, I contend that before a 'binocular' resolution of the manifest and scientific images of music can be properly undertaken, a wider ontological base for music (manifestly described) must be accepted, one which is inclusive of the notion of persons embedded within cultures (and all that entails).

Let us see how Garfield's proposal for a "large, irregular supervenience base" for representational phenomena might apply specifically to music cognition theory. As noted above, there is a generally acceptable vagueness associated with cognitivist approaches to music theory (in terms of the specification of the characteristics of representational phenomena) that is normally attributed to the individualistic tendencies of the subject (i.e., the cognizer). As the orthodox cognitivist story is usually told, mental representations are subjectively constructed and depend for that construction upon an individualized set of cognitive processes. In other words, it is an oft-made conclusion that in the individualistic supervenience mode there is an acceptable level of vagueness in the cognition of music that is deemed to be due to individualized sets of listener-attributable processes. On the other hand, in a manifest image supervenience mode, the mental representations of a participant in music would have the advantage of tending away from a situation of individualization to one of being accountable for, to paraphrase Garfield's statement above, within a person's "network of relations to one's environment and one's cultural, linguistic and musical community." In this sense, mental representations arising from participation in music would have to be more complex, adding intersubjectivity to the subjective/objective dichotomy, but might nevertheless offer a potentially more definable characterization.

A good example to consider is Beethoven's *Ode to Joy* theme, which occurs, of course, in the final movement of his *Ninth Symphony*. However, since its original appearance in Beethoven's symphony, the *Ode to Joy* theme has reappeared in a number of new contexts. For instance, the *Ode to Joy* theme has been used in rock music settings, played with drums and guitars, in television commercials to sell cars, as well as having been quoted by other composers in their own original works. There are many more contexts in which the *Ode to Joy* has been used, such as in feature films, documentaries, ceremonies, etc. It can certainly be said that the *Ode to Joy* theme has been heard by a wide variety of listeners, and has certainly been played by all levels of performers involved in a range of musical idioms.

As Garfield might agree, the vagueness that occupies the formulation of the psychological *linguistic* predicate might equally infect a situation concerning a *musical* psychological entity. Recall that in terms of the scientific supervenience mode, there is an acceptable level of vagueness associated with the musical psychological predicate which would be accounted for as listener-attributable. That is, on this account, the participant's particular listening experience is deemed to be the principal determining factor in the formulation of a musical psychological predicate of the *Ode to Joy* theme.

In a manifest image supervenience mode however, the musical psychological predicate that arises would certainly be partially attributable to the listening experience but only as one factor among many in a wider context of participation in the musical event. As each contributing factor is taken into account, the psychological predicate becomes more defined, but also more complex. For instance, a performer's relation to the orchestral sounds around her, the tactile nature of the instrument she plays, the stage and the lights, her anxiety, the number of pieces she knows by Beethoven and all the myriad factors leading to the performance of the theme become in themselves attributable factors to the kind of psychological correlates which may arise from said participation in the *Ode to Joy* theme. Each factor connected with the experience of the *Ode to Joy* theme then becomes a small but integral part of a multi-faceted picture of the musical psychological predicate.

In conclusion, Garfield elicits three morals from the above reasoning. The first moral is that "syntactic (that is, solipsistic) accounts of inductive reasoning are taken to be insufficient" (Garfield, 1988: p. 150). The second moral is that "the theory of inductive reasoning must be framed in terms of the organism's or machine's knowledge and goals, and of the use to which that knowledge and those goals are put" (Garfield, 1988: p. 150). The third moral is that "although syntactic accounts of processing are irrelevant to understanding a system's inductive performance, these accounts can provide only a partial explanation of inductive capabilities" (Garfield, 1988: p. 150). On this account, and especially in terms of the models of music cognition examined in this study, syntactic models of inductive reasoning offer a severely restricted explanation of musical cognitive activities. In dealing with each of the particular models, this point will become a particular focus of criticism.

3.4 The autonomy principle

Cognitive psychology sets out to explain the workings of the internal cognitive system, how it processes, stores, manipulates and transforms information and how the use of informa-

tion influences and guides behaviour. Stich (1983) explains the workings of this individualized system in terms of the 'autonomy principle.' He states that

the states and processes that ought to be of concern to a psychologist are those that supervene on the current, internal, physical state of the organism....What this amounts to is that any differences between organisms which do not manifest themselves as differences in their current, internal, physical states ought to be ignored by a psychological theory. If we respect the autonomy principle, then the fact that a pair of organisms have different histories or that they are in significantly different environments will be irrelevant to a psychological theory.... (Stich, 1983: p. 164)

Stich argues that the autonomy principle is an effective weapon to use in engaging in the so-called 'replacement argument.' That is, if a person were replaced by a cell-for-cell replica from some other galaxy, that new person would be psychologically identical to the original, regardless of differences in history. Garfield explains that under the autonomy principle "our different histories make no difference to our psychology, and if they do not, then no such extraorganismic variables can be relevant to an organism's psychology" (Garfield, 1988: p. 57). Given that cognitive psychological theory is predicated on the physical (i.e., neurobiological) instantiation of the human information processing system, phenomena relevant to the properties of that system are going to be seen as supervenient upon those neurobiological states. So, as the 'autonomy principle' story goes, if we are to learn more about the processing of information coming to the system and its resultant behaviour, it is ultimately going to depend upon our knowledge of the workings of the neurobiological system.

However, Garfield identifies the central problem for methods of investigation which rely upon the 'autonomy principle' as a matter of attempting to reconcile the gap between noncontentful psychological phenomena (scientifically conceived) with contentful psychological phenomena (manifestly conceived). He states that

it seems impossible that anything like the PAs [propositional attitudes] as construed by the manifest image—that is, as individuated as contentful—can meet the conditions for psychological phenomena, because no phenomena individuated by content can satisfy the autonomy principle and no phenomena that violate the autonomy principle are suitable objects for psychology. (p. 57-58)

Garfield offers three explanations why this problem persists. First, for a psychological state to be contentful, Garfield argues that the context from which the ascriber attributes that content must be taken into account. However, the problem is that the existence of psychological states sensitive to extra-organismic considerations violates the autonomy principle. Second, Garfield notes that the vagueness inherent in the notion of content itself presents problems for the purposes of classifying or generalizing psychological states. Garfield's stated reason for this is that if there is not a means of identifying psychological states by classes because of vagaries in "the interests and perspective of the attitude ascriber...they [the PAs] fail to constitute appropriate classes for a scientific psychology" (Garfield, 1988: p. 58). Third, resulting from the first two reasons, Garfield concludes that "predicates whose extensions are determined by content ascriptions appear not to be projectible" (Garfield, 1988: p. 58). That is, if psychology is to be called a science, Garfield says that it ought to be "embeddable in some sense (perhaps short of genuine reduction) in a more fundamental science such as neurobiology...but if intentional predicates are vague and nonautonomous, they can't have corresponding neural properties, since neural properties are [by definition] determinate and autonomous. Thus, on this account, the intentional properties are nonprojectible and hence unsuited for a scientific psychology" (Garfield, 1988: pp. 58-59).

So here lies the problem. On one hand, psychology, as a scientific endeavour predicated on the notions of individualism and precision, has the daunting task of accounting for the propositional attitudes. On the other hand, there is the problem of reconciling the PAs (construed as nonindividualistic and vague phenomena) with a seemingly necessary connection with linguistic context. This very problem, expressed in terms of general cognitivist theory, appears to be remarkably consistent in terms of CTM. That is, on one hand, the psychology of music, as a science, endeavours to be predicated on subjective organization, has the task of accounting for what Fiske identifies as the 'aesthetic attitudes.'¹⁴ On the other hand, there is the similar problem of reconciling the apparent individuality and vagueness of the 'aesthetic

^{14.} See Chapter 8 for a full account.

attitudes' (complete with their nonindivualistic characteristics) with the wide and irregular context of musical experience (manifestly described).

In an attempt to solve this problem, Garfield identifies two strategies which he calls 'reconciliationist' and 'eliminitavist.' The former attempts to salvage the individualism and precision of psychology while at the same time retaining the PAs by providing an individualistic account of them. The latter attempts to retain the individuality and precision of psychology by banishing the PAs from the ontology of psychology. For our purposes, I shall concentrate on the strategy employed by the 'reconciliationalist' approach exemplified in what Garfield refers to as Fodor's *Methodological Solipsism* and Pylyshyn's *Naturalistic Individualism*. Very briefly, a 'solipsistic' explanation arrives at a characterization of the internal events and states of an organism without regard to its history and environment or even outside its own central nervous system. A 'naturalistic' explanation takes into account the relation between the internal events and states of an organism and its history and environment.

The solipsistic explanation fits the computational paradigm very well. Fodor explains that

as long as we are thinking of mental processes as purely computational, the bearing of environmental information upon such processes is exhausted by the formal character of whatever the oracles write on the tape. In particular, it doesn't matter to such processes whether what the oracles write is *true*...I'm saying, in effect, that the formality condition, viewed in this context, is tantamount to a sort of methodological solipsism. If mental processes are formal, then they have access only to the formal processes of such representations of the environment as the senses provide. Hence, they have no access to the *semantic* properties of such representations, including...the property of being representations of the environment. (Fodor, 1980 [quoted from Fodor 1981, p. 231], Fodor's italics)

Fodor's criticism of the naturalistic approach is that the vocabulary of a naturalistic explanation can never be viable as a vocabulary for a scientific explanation. His reason is that such a vocabulary would be irreconcilable in terms of being projectible in both psychology (as a science) and the vocabulary of the environment, even if environmental science, as one of the physical sciences (which would have to include all the sciences) could have such a complete and workable vocabulary as to include psychology, which, at present, it does not.

The question arises how we are to interpret what goes on in the internal organism without an appropriate vocabulary. Garfield explains that, in terms of the solipsistic framework, "in order to assign content to the system, and hence to arrive at psychologically useful words and generalizations, we imagine an interpretation of the system's language and architecture such that under this interpretation the system's behavior would make sense in an environment pretty much like the one we live in. In doing so, we remain solipsistic" (Garfield, 1988: p. 63). Therefore, a description of the system under the guise of methodological solipsism can then be arrived at without concern for the truth or falsity of the representations ascribed to the system itself. Garfield explains that "methodological solipsism is an epistemological matter—a commitment to the dispensability in principle, if not necessarily in practice, of information concerning the subject's environment and his or her relations to it; the individualism is an ontological matter—a commitment to the view that a subject's psychological state is to be identified with his or her nonrelational physical states" (Garfield, 1988: p. 64). It is in this way that methodological solipsism characterizes mental states as contentful: that is, the content of the mental state is said to be a function of the interrelation of the computational symbols that the system manipulates. In effect, this is the source of the 'syntax parallels semantics argument' as proposed by Fodor.

On the other hand, the naturalistic explanation attempts to reconcile internal representations of events or situations in the environment with actual instances in the environment itself. Thus, naturalism sets up relations among the organism's various cognitive states as well as to its distal environment. For instance, a music cognizer's representation of a musical passage at hand would be set up in a relation to representations of previously heard instances of the musical passage in question. The so-called 'symbols' in the listener's head are said to cause her behaviour because those particular symbols (and not others) represent to the listener the fact of the musical passage (manifestly described). This is the parting point between naturalistic individualism and methodological solipsism. Nevertheless, the essential ingredient to both approaches (naturalistic and solipsistic) is that cognitive states supervene on the internal mind/brain. In terms of both accounts, Garfield concludes that "in cognitive theory, informationprocessing states have to be identified by their content (this is what makes the position reconciliationist, and this is where Naturalistic Individualism and Methodological Solipsism converge" (Garfield, 1988: p. 66).

In the next few paragraphs, I shall attempt to position the music cognition models examined in this study on a conceptual map whose boundaries include the naturalistic and solipsistic points of view. Admittedly, the drawing of hard and fast lines is not always a fruitful task. My point in making the attempt is first, to indicate the approximate position of each model in the theoretical terrain, and second, to expose any emerging trends in theory development occurring over the last two decades. At first glance, one trend that appears in CTM is that there has been (at least if one deduces a trend on a chronological basis) a rough shift in focus from the naturalistic to the solipsistic point of view. I say 'rough' because the overall trend in the development of music cognition theory over the last century and a half has also been one of a gradual internalization from predominantly perceptual to strictly mental processes. That is, the general trend has been to deprioritize the perceptual aspects of music cognition in favour of the purely cognitive in an effort to reduce the perceptual aspects of musical experience to an instrumental role.

The processing-rule model (as formulated by Heller and Campbell) can be traced through articles they published from 1976 through 1988. The task of positioning their work on the naturalistic/solipsistic conceptual map depends on which aspect of the theoretical model one takes as the primary focus: the processor or the executive component.¹⁵ If one examines the processing-rule model strictly in terms of the processor, the discussion of context must be limited to the aural-cognitive domain. That is, the discussion of relations the listener may have with the distal environment is limited not just to the general aural environment, but is restricted to the *sonic* characteristics of the musical stimulus itself: that is, the instrument or voice making the sounds. In this respect, H/C might be said to be following a naturalist line of argument with

^{15.} I shall provide a detailed explanation of H/C's model in Chapter 5.

certain restrictions. However, if one examines the processing-rule model in terms of the executive component, one finds that its operations are solipsistic in the sense that the processing of the executive component is limited to nonindividualistic symbolic manipulation with no connection whatsoever to the distal environment.

It is not entirely obvious where the 'generative music grammar' model (Lerdahl and Jackendoff) fits into this scenario. In this model, the musical intuitions of a listener are taken to be the product of a listener's experience in a particular musical idiom. At first glance, one might place this model in the naturalistic camp because so much importance is placed on the experiential factor. On the other hand, L/J maintain that the acoustic signal triggers "mental (cognitive) operations that impose order on information derived from that signal" (L/J, 1983; p.370). It would seem by the above statement that the order imposed by the cognitive apparatus is methodologically solipsistic in one sense and naturalistic in another. As with the processingrule model, the incoming signal is the solely permissible connection with the distal environment. However, the listener's experience in a particular musical idiom serves only to assist the internal processing system in devising a better method of converting incoming data. This is so that the system will function more easily in future instances when processing tonal and rhythmic patterns that have a similar match to previously encountered patterns. On that account, the system might appear to be solipsistic. In my view, this apparent confusion (in both the processing-rule and the generative grammar model) is principally due to the assumptions adopted in terms of the APV. As previously described, but in this new light, the so-called 'musical' distal environment, according to all the models examined in this study, is defined as strictly that which is afforded by the sonic stimulus. In this sense, the larger ('nonmusical') distal environment is deemed to have no effect on the actual processing one way or the other.¹⁶ Thus, the notion of content (in this case, APV-based 'musical' meaning) is solipsistic. On this

^{16.} It is important to note that the terms, 'musical' and 'nonmusical,' or 'extramusical' often retain their meaning in terms of a specific formalist (APV-derived) point of view. I think of this usage as being set within a narrowly-defined spectrum. Without the governance of the APV, the terms 'musical' and 'nonmusical' can embrace a broader spectrum not afforded by formalist parlance.

account then, I would have to say that, on balance, the generative grammar model leans towards the methodological solipsism section of the conceptual map.

The 'temporal processes' model virtually eliminates perception, specifically in terms of its contribution to cognitive processing. The stated focus of the 'temporal processes' model is restricted to the parameters of the aural-cognitive domain, but there is some confusion created, due to a deprioritizing of the sonic component and a subsequent prioritizing of the temporal component in the musical ontological framework. In my view, this move causes confusion in terms of understanding how the model relates the music participant in a temporal environment to cognitive processes.¹⁷ As with the two previous models, the 'temporal processes' model is a two-component theory, the difference being that the principal divisions in the model are between 'temporal' and 'nontemporal' cognitive processes. On one hand, temporal processes reveal certain relational characteristics to the distal (i.e., sonic) environment, giving the impression that the model is naturalistic. However, the nontemporal processes are conceived as abstract in character, giving the impression that the model better aligns with methodological solipsism. Again, as with the other models, I attribute this confusion at least in part to the adoption of the APV as the philosophical basis for theory-making.

The 'rule management system' model more closely aligns with a stricter version of methodological solipsism. Fiske defines music cognition as "the dynamics of musical thinking, [and] concerns four dimensions: (a) the nature of the information provide to a cognitive processing network; (b) the structure of the network and the activities that define it; (c) processing outcomes; land (d) significance of these outcomes for the individual" (Fiske, 1990: p. iii). According to Fiske, the content of so-called "realized musical structures" is deemed to be a product of the interaction of the structures themselves. However, the notion of musical content in the context of musical cognition is restricted to the system's capacity for placing given patterns on a scale of similarity and dissimilarity to other given patterns. Nevertheless, Fiske's stated intention is to proceed along the lines of Fodor's notion of methodological solipsism.

^{17.} I shall elaborate on this point in Chapter 7.

Again, as with the other models, this view is premised on the adoption of the APV as the philosophical starting point.

As explained earlier, the APV is an ontological description of music (manifestly expressed). Music, described in terms of the APV, is restricted to a characterization of its formal properties and as such, makes a very good fit with the solipsistic aspects of the models described above. In other words, there is a smooth transfer from manifestly described formal properties (as a description of the aural distal environment, APV-based) to scientifically described formal properties (as a description of the internal psychological model). However, as previously indicated, the APV is inadequate as a basis for establishing an ontological account of music partly because it is in itself a view that is culturally derived. This last point impinges severely on claims for the universality of cognitive processes held by all the models examined in this study. In the next section, I shall attempt to elicit some of the reasons underlying this problem in terms of the issue of domain demarcation.

3.5 Domain demarcation in cognitivist music theory

In this section, I propose to investigate what may be at the root of the apparent trend towards a methodologically solipsistic model of music cognition. In my view, it is a foundational issue which centres on the identification of domain. In fact, the issue of domain identification may be *the* issue of contention in all psychological theory and certainly in CTM. In point of fact, the issue of domain demarcation may ultimately influence the ebb and flow of all future theory development in music cognition.

Garfield suggests (expanding on an earlier idea of Pylyshn, 1984) that the demarcation of domain in psychology has an underlying methodological theme. Garfield defines a domain as

a range of phenomena (where this is neutral between objects, events, properties, states, processes, or any other ontological category) about which "it is possible to develop theories based on a special vocabulary or reasonably uniform set of principles" distinct from and independent of those appropriate to other domains. Domains are hence individuated not directly with reference to an arbitrary taxonomy of things contained in them (living vs. nonliving, terrestrial vs. celestial, etc.), but rather reference to the vocabularies and explanatory

strategies appropriate to their investigation. The inventory of things in a domain is determined, in turn, by the limits of the successful application of these vocabularies and strategies. Domain individuation hence proceeds on pragmatic rather than ontological principles. (Garfield, 1988: pp. 10-11, inner quote from Pylyshn, 1984: pp. xi-xii)

Garfield favours a pragmatic approach to domain demarcation. He explains that it has two advantages. First, a pragmatic approach can make possible the scientific investigation of disparate and seemingly unrelated categories of phenomena. Second, a scientific investigation can proceed on pragmatic principles with the intention of approaching a particular phenomenon employing a variety of explanatory strategies and vocabularies. Concerning the issue of domain demarcation in contemporary cognitive science, Garfield raises Pylyshn's point that humans are assumed to be what he describes as "informavores, or cognizers, [and] understanding human nature can also gain from the study of principles governing members of that domain. At the moment it appears that included in this category are the higher vertebrates and certain computer systems" (Garfield, 1988: p. 10, from Pylyshn, 1984: pp. xi-xii). Thus, by including humans and computers in the same investigative domain, cognitive science is adopting a pragmatic approach in treating the study of human psychology in terms of conceiving of humans as information-processing systems.¹⁸

Garfield notes that adopting a pragmatic approach to domain specification in psychology (and perhaps as well, in terms of music cognition theory) raises three possible hazards. First, Garfield states that the selection of domain might be incorrect to the extent that "what one thinks to be a domain is not in fact one, and hence that one's scientific enterprise—not one specific theory of hypothesis, but one's entire paradigm—may turn out to be a blind alley" (Garfield, 1988: p. 11). According to Garfield, that situation exists because a domain depends for its description upon "a particular theoretical vocabulary and [is] explained by a particular set of generalizations, laws, or other theoretical strategies" (Garfield, 1988: p. 11). If a domain specification turns out to be false, Garfield states that it could "render a significant portion of

^{18.} I shall elaborate on this point in subsequent chapters concerning the individual theoretical models.

the vocabulary and the explanatory apparatus thought to constitute a domain senseless and useless" (Garfield, 1988: p. 11).

A second hazard (in the adoption of a pragmatic approach to domain demarcation) could arise in the sense that certain phenomena, originally thought to be within a domain, are actually outside it, and/or vice versa. In later chapters, we will encounter discussions concerning this particular situation. For example, the temporal cognitive processes model deprioritizes the acoustic entity and prioritizes the temporal aspects of sound production in the demarcation of domain. This endangers the internal validity of the model on two counts. First, a strategy to justify the reversing of the traditional (orthodox) 'sound-in-time' ontology to a 'time-described-in-sound' ontology must be developed; and second, a strategy for accounting for the now deprioritized sonic component must then be developed. This is not successfully achieved, mainly because of certain inherent conceptual problems that remain with the reversal of the traditional ontology.

Perhaps the greatest danger to the security of the demarcation of theoretical domains, and especially for the theoretical models examined in this study, is in terms of the risks imposed by what Garfield calls "intertheoretic reduction." Garfield states that "the entities and principles governing a domain may become superfluous as a consequence of intertheoretic reduction...On Churchland's [1979] view, the central features of successful theoretical reductions are the *displacement* of the reduced theory by the reducing theory and the *preservation* of an 'equipotent' image of the reduced theory in the reducing theory" (Garfield, 1988: p. 12, Garfield's italics). That is, in theory preservation, a successor theory may more fully account for an identical or greater range of phenomena than its predecessor without endangering the validity of the predecessor theory, whereas in theory displacement, the entities and principles of a reducing theory replace those of the reduced theory.

Since a principal focus of this investigation concerns the ontology of music cognition, I must return to the earlier account of the manifest and scientific images, specifically in terms of the essentially ontological issues concerning the gap between explanations for the cultural experience of music as manifest descriptions of music versus explanations of music cognition as scientific descriptions of music.

Garfield makes two pertinent points concerning the relation of theoretical to ontological issues. First, a scientific account is not (and cannot be) a reduction of a manifest account because the domains being considered are deemed not to be theoretical in Churchland's sense, but are rather ontological. Garfield states that "to the extent that an account of a domain is not theoretical...there is no sense in which it [a theoretical account of a domain] is a candidate for reduction to anything" (Garfield, 1988: p. 13). Garfield's second point concerning the relation of theoretical to ontological issues is that Churchland's account of theoretical reduction does not commit one to a claim that the theoretical posits of the predecessor theory can be "shown to be identical with, or definable in terms of, items in the ontology of the reducing theory" (Garfield, 1988: p. 13). Thus, ontologies may be replaced on a wholesale basis without affecting the validity of the theoretical reduction. However, Garfield identifies the major sticking point when he says that "this says nothing about ontologies that may not be theoretical in nature" (Garfield, 1988: p. 13). Garfield points out that a reduction of a less fundamental theory (e.g., psychology, economics, or music cognition) to a more fundamental theory (e.g., physics or chemistry) is often seen as a way to vindicate the reduction by demonstrating that the reduced theory has a firmer grounding by virtue of being expressed in terms of what he calls an "epistemically sounder theory. But it in no way follows that the absence of such a reduction should be construed as an epistemic blot on a high-level theory" (Garfield, 1988: pp. 13-14).

The issue of domain demarcation in terms of general theory of psychology is an issue which specifically concerns CTM because its ontological domain is *a priori* embedded in the scientific image. As noted earlier, the scientific image of music cognition is described in terms of the APV, allowing the discussion of musical ontology to be reduced to the (methodologically manageable) aural-cognitive domain. The history of intertheoretical reduction in music cognition theory has been witness to a progressive shrinking of the boundaries of theoretical domains from a perceptual-cognitive to a purely cognitive demarcation. In terms of more recent theoretical models, the perceptual (aural) domain has been further reduced to an instrumental role and subsequently deemed 'non-cognitive.' This amounts to a pragmatic tactical move of placing perception outside the theoretical domain.

The difficulty arises when music cognition theory (within a scientifically described ontology) attempts to move beyond its own prescribed limits and account for music as a cultural phenomenon (within a manifestly described ontology). In an important sense, one of the principal goals of CTM is to reduce the cultural aspects of music to a cognitive description (which will ultimately be reduced to a neurobiological description). Garfield makes two interesting points which illuminate the above point. First, he states that the theoretical terms of the reducing theory do not necessarily have to be understood as "identical with, or definable in terms of, items in the ontology of the reducing theory" (Op. cit.). Therefore, on that account, cultural theory does not necessarily have to be understood or explained in terms of neurobiology. Second, the reduction of cultural descriptions to cognitive descriptions (and ultimately to neurobiological descriptions) does not necessarily vindicate the reduction. Therefore, an understanding of a cultural description in terms of a more fundamental description does not necessarily lend more credence to the reducing description, as Garfield states, "by demonstrating that it has an image in the epistemically sounder theory" (Op. cit.).

I agree with Garfield that the demarcation of the theoretical domain of music cognition can be better achieved by maintaining a binocular ontological view of the manifest and scientific images. Perhaps it might be more fruitful to suggest that the theoretical domain of music cognition should adopt what I shall dub a 'neo-syncretic' point of view, embracing the APV as one among a multitude of possible stances from which to base theory development.¹⁹ I am not sure if taking an instrumentalist point of view is the ultimate solution, but at least it does serve to put the dichotomy of theoretical and ontological domains into a pragmatic perspective.

^{19.} I am not sure of the appropriateness of the term 'neo-syncretic,' but I shall use it as a working term for now. It seems appropriate in the sense that syncretic philosophical movements historically have exhibited a blending of inharmonious elements. For example, there was a syncretic movement in the 16th century which attempted to reconcile the theories of Plato and Aristotle.

As noted earlier, the APV (as a description of the domain of the manifest image of music) is embedded in the domain demarcation of CTM. By force of the embedding, the APV has taken on the guise of scientific truth and has come to be identified in terms of the ontological characteristics of the aural-cognitive domain of music. My suggestion for the adoption of a 'neo-syncretic' point of view (embracing both the manifest and scientific images of music) will have two advantages. First, it will serve to de-naturalize the APV (scientifically described), and subsequently re-position the APV (now manifestly described) as one (of several) views from which to make an ontological description of music. Second, this move will provide the basis for a realignment of domain demarcation for subsequent development in music cognition theory which will permit the taking into account the whole of human musical experience, embracing a variety of points of view (manifestly conceived) which include the aesthetic, the conceptual, and the referential among any number of others.

3.6 Conclusion

This ends the presentation of the essential elements in this study. As previously outlined, my investigation and critique of CTM hinges on two problems. In the previous chapter, I discussed the APV as a stance from which to understand music. As I see it, the first problem with CTM is instantiated in the naturalizing of the APV. In this chapter, I have discussed in detail the friction that persists between the manifest and the scientific images as opposing ontological views of the world of music.

I have suggested an alternative approach to theoretical development which will of consequence necessarily entail a neo-syncretic view of music cognition. It is hoped that this move will enable music cognition theory to embrace the whole of the human experience of music. In the next chapter, I shall trace the path of the development of music cognition theory in modern times, dating from the mid-nineteenth century up to the post-war period (1950's).

Chapter 4

Historical Perspectives for Cognitivist Theory of Music

4.1 Introduction

The purpose of this chapter is to contextualize historically the current state of CTM. My hope is to show that the present situation in the development of music cognition theory does not exist in historical isolation, but rather is at a stage in a progression of theory development that has been going on for approximately the last century and a half. We might classify the stages of historical development of music cognition theory as falling into three general models which more or less follow a chronological order.

Early theories of music cognition were formulated on the 'psychoacoustic' model. Briefly, psychoacoustic models are interested in the activity of the ear in response to the acoustic signal. I shall focus my description of the 'psychoacoustic' model on the work done by Helmholtz (1863) and Seashore (1938). From there I shall move on to the 'cognitive' models developed by such people as Mursell (1937), Simon and Sumner (1968), Longuet-Higgins (1976), Deutsch and Feroe (1981), Balzano (1982), Shephard (1982) and Krumhansl (1990). 'Cognitive' models internalize the act of music cognition by prioritizing the role of brain activity and de-emphasizing the formerly prominent role of the auditory apparatus given by the psychoacoustic model. This will be followed by a discussion of the 'pattern-structure' models exemplified by the work done by Dowling and Fujitani (1971), Dowling (1978) and Dowling and Harwood (1986). 'Pattern structure' models further internalize the activity of music cognition as a process of the construction of patterns in the brain.¹

Besides giving historical context to the present state of affairs in CTM, my hope is to show that throughout the history of music cognition theory, there has been a progressive internalizing of the processes of music cognition. In addition, this chapter will also serve as an introduction to the more recent 'processing-rule' model, exemplified by the work of Heller and

^{1.} The terms, 'psychoacoustic,' 'cognitive' and 'pattern-structure' are borrowed from Fiske's (1992) contribution.

Campbell (1976, etc.) and followed by the contributions of Lerdahl and Jackendoff (1983). 'Processing-rule' models focus on descriptions of innate cognitive structures which are said to permit music cognition to take place. Due to the detailed treatment I wish to make of the contributions by Heller and Campbell and Lerdahl and Jackendoff, I shall devote separate chapters to each of their models.

4.2 The psychoacoustic model

Early psychoacoustic theories were concerned with linking what was known about the physics of sound with the physical processing and subsequent auditory perception of the musical acoustical signal. Hermann Helmholtz, in his 1863 book *On the Sensations of Tone*, was convinced that the science of acoustics and the knowledge of human auditory systems could completely explain the human capacity to practice and experience music. Helmholtz claims that the route to an understanding of how humans experience the formal elements of music, such as scale structure, tonality, timbre, consonance, dissonance, or chord structure and harmony is through an understanding of the relation of acoustics to the structure of the human ear. It is also important to note (and relevant to this study) that Helmholtz approaches music from the APV. For Helmholtz, any contextual factors connected with the experience of musical sounds are not to be considered a part of theorizing in music cognition.

Helmholtz's work is not taken as seriously today as it was in the past. I am guessing that then-current thought in physiology and psychoacoustics validated his work in auditory processing. However, for our purposes, there seems to be a timely coincidence between Helmholtz's theory of acoustics and auditory processing and nineteenth-century theory of musical aesthetics. I am guessing that contemporary thought in musical aesthetics had more than a passing influence on Helmholtz's theoretical work in psychoacoustic processing. I am referring in particular to Hanslick's (1854) volume, On the Musically Beautiful: a Contribution towards the Revision of the Aesthetics of Music. Hanslick promotes a theory of musical formalism in which a proper and sufficient explanation of the experience of a piece of music can be achieved solely by means of an examination of the tonal and rhythmic relationships within that piece of music without requiring reference to any contextual content connected with the music. In particular, Hanslick rejects any element outside the realm of pure tonal and rhythmic relationships in music as specifically extramusical. Instead, Hanslick focuses on the notion of the 'intrinsicality' of the musical tone; that is, he argues that the universal qualities of a musical tone, like a colour, transcend individual interpretation. In arguing against the notion that music can represent specific emotions, Hanslick claims that "tones, like colours, possess symbolic meanings intrinsically and individually, which are effectively apart from and prior to all artistic intentions" (Hanslick, 1986: 11).

Critics of Helmholtz point out that he did not go far enough in his quest to find an explanation for the internal mental workings taking place in music cognition. Concerning this point, Fiske notes that

although Helmholtz provided an important data base for subsequent work in music perception, his theory does not explain musical thinking and decisionmaking, activity that is today considered by many to be at least equally important in a theory of music to psychoacoustic processing. (Fiske, 1992: p. 361)

It is vital to understand what Fiske is actually implying when he uses the term 'musical thinking.' It will be critical to our understanding of Fiske's theoretical model that his agenda centres on the assumption that 'musical thinking' is restricted to the kind of formal decision-making activity involved with the analysis of tonal and rhythmic relationships. It will be equally crucial to understand that Fiske, in adopting the APV (*cum* Helmholtz) as a philosophical premise for theory-making, is *de facto* making an argument that Helmholtz did not go far enough in providing a formalist explanation of the type of cognitive activity that proceeds from psychoacoustic processing. In the final analysis, however, Helmholtz's work provides the basis for new initiatives in music psychology and theory of psychoacoustics.

Helmholtz furnished the historical impetus for Carl Seashore's work in music psychology. Seashore contends that an analysis of the formal constituents of sound (i.e., frequency, intensity, duration, wave form) will lead to an explanation of auditory perception and how it manifests itself in music and speech. Seashore claims that humans have preset and individualized perceptual capacities which determine each person's potential aptitude for music. To this end, he developed a battery of acoustical tests which purported to assess individual musical aptitude.

As noted above, Seashore's principal thesis is that each dimension of sound (i.e., frequency, intensity, duration, or wave form) has a perceived psychological correlate (i.e., pitch, timbre, loudness, or duration). He argues that these so-called 'elemental capacities' are innate determinates of individual capacities for the powers of sensitivity and discrimination of the acoustic signal. Thus, according to Seashore, musical aural perception and its subsequent cognition are governed by the listener's own capacity to sense *sound*. This is so, because Seashore considers perception and cognition to be the mental correlates of the actual sounds heard.

Interestingly, Seashore's theory also includes a discussion of other types of capacities which have an effect on one's musical personality type and imagery type. Without going into detail, it seems apparent that Seashore believes that other factors besides the capacity to distinguish the characteristics of a tone also impinge on musical potential. On a speculative note, an investigation into so-called 'non-musical' (i.e., non-formal, as specified in terms of the APV) capacities may shed some interesting light on our understanding of musical apprehension. However, it is my suspicion that for CTM the admission of such aspects of cognitive functioning as personality type and imagery type would broaden the discussion of music cognition to such an extent that the question of environmental factors would arise. This would create the undesirable effect of throwing the music cognition theory effort off its designated formalist and internalist course.

4.3 The cognitive model

In reaction to the notion of the correlation between acoustic and perceived events as proposed by Helmholtz and Seashore, 'cognitive' models began to be developed. In 1937 (one

year before Seashore published his book), James Mursell set the stage for a shift of emphasis from a 'psychoacoustic' to a 'cognitive' model.² In expressing it another way, one might say Mursell argues for a shift in the causal source of music from the acoustic event to the mental

apparatus. Mursell states that

music is created by the human mind, and all its effects and everything in its structure depends upon the reaction of the mind to the material of the senses. So it follows that any ultimate explanation of music as a factor in human experience, racial and individual, must be made in terms of the science which deals with the mind and its reactions—that is in terms of psychology. Acoustics no doubt is indispensable for the solution of many of the practical problems of the musician. But the entire rationale of the art itself can only be psychological. (Mursell, 1937: p. 10)

In a further de-prioritizing of the acoustical domain as the central focus of music cognition,

Mursell states that

music depends essentially not on the stimuli which reach the external ear, nor even upon the responses which the structures of the inner ear make to those stimuli, but rather upon the organizing and transforming operation of the mind upon them. (Mursell, 1937: p. 50)

Two terms from the above excerpt, 'organizing' and 'transforming,' provide important clues as to the direction for which Mursell was paving the way. As noted, Mursell makes a crucial shift of focus in beginning to view the mental apparatus as a processor and generator of mental representations triggered by acoustic stimuli. This shift to considering the mental apparatus as the causal source of music eventually led to the development of 'cognitive' models (Simon and Sumner, 1968; Longuet-Higgins, 1976; Deutsch and Feroe, 1981; Balzano, 1982; Shephard, 1982; and Krumhansl, 1990) which attempt to show that mental representations of musical percepts are formed from the incoming acoustic signal. The idea of a representational cognitive model is based on the notion that the acoustic signal, although a necessary component of auditory perception, is not in itself sufficient be explanatory for, or be causal of music. Thus, in taking this important conceptual step, the cognitive model rejects the notion of unity between

^{2.} Mursell actually referred to this as the 'psychological' model.

the acoustic signal and its mental correlate and replaces it with the new notion of a highly abstract account of mentally-caused music cognition instantiated in mental representations.

There are four points of agreement among various theorists of the 'cognitive' model. First, they all share the assumption that the brain is genetically predisposed to search for patterns and relationships in the acoustical signal, based on a set of processing rules which are commonly held and which result in the realization of commonly shared auditory percepts. Second, they all require that any model based on tonal pattern relationships must first account for the phenomenal characteristics of the actual tone, such as pitch and pitch height. Third, they all make a distinction between the sensory organization of the immediate acoustic signal (in terms of small-scale Gestalt pattern organization) and the large-scale structural organization stored in long-term memory. Proponents of the cognitive model assume that sensory organization operates by heuristic processes and memory systems (both short- and long-term) operate by algorithmic processes. A rule-based organization of memory systems is said to be acquired with training and experience and is specific to the musical idiom in which the participant is experienced. The fourth point of agreement among cognitive theorists is that sensory organization is realized in the organizational principles of tuning, scales and tonality.³

Thus, the principal thrust of the cognitive model is to shift the focus of musical comprehension by creating a theoretical design which prioritizes representational schemes and deprioritizes the immediate acoustical stimulus. In effect, this move opens the way for the kind of theory development which has the express purpose of internalizing musical understanding and comprehension. As well, it sets the agenda for promoting the argument that practical musical applications, uses, knowledge, skills, conventions, habits and customs, etc., are all grounded in an internalist and causal view of music cognition. With the cognitive model, the shift to the scientific supervenience view of music is now complete.

^{3.} Tonality in this context is construed in the broadest terms possible so as to apply to all musical idioms.

However, for the 'cognitive' model to be successful, theorists generally insist on three preconditions. First, the theoretical model must relate actual perceptual experience to cognitive realizations of that activity. Second, the cognitive model must generate testable hypotheses in actual listening situations, using artificially devised experimental melodies or 'actual' music. Third, the cognitive model must be cross-culturally generalizable; that is, the model must account for individual musical experience within a given musical culture and avoid the conclusion that there are different brain (read mind) types for different musical cultures. However, the important point for the perspective-setting purposes of this chapter is to note that perceptual processes (as described by Helmholtz and Seashore) are understood to be limited to the pre-cognitive level and merely function in terms of setting the stage for the explanations of cognitive processes of musical pattern recognition, identification and comparison.

4.4 The pattern structure model

The next stage in the historical development of CTM involves the development of models dedicated to the study of the mental representation concerning the types of features or descriptors involved in the recognition and recall of tonal-rhythmic patterns. Pattern structure' models are based on the pretheoretical view that a description of the acoustical signal as a correlate to perception is insufficient for a proper explanation of music cognition (see earlier psychoacoustic models).

A central premise of 'pattern structure' theory is that the understanding and comprehension of musical structure depends on the brain's innate capacity to search for relationships between and among stimulus events and then to create patterns from them. The model proposes several 'pattern descriptors' which are deemed to be candidate components of musical mental representation. The model is hierarchical, in the sense that well-learned patterns by experienced listeners are said to be represented in memory in a priority list which puts 'chroma' patterns at the lowest level, rising to 'absolute interval' structure, with 'melodic contour' positioned at the top. 'Chroma patterns' are described as the subjective experience of pitch, such as that which occurs in the abstraction of the pitch levels in a tonal scale. An example of a chroma pattern is found in the "do-re-mi labels in a movable-do system" (see Dowling and Harwood, 1986: 138, 142) that a person might use to abstract a melody.

'Melodic contour' is defined as a pattern variable which describes the intervallic direction of a series of tones. The notion of contour as a cognitive capacity was employed in tests (Dowling and Fujitani, 1971; Dowling, 1978) to note differentiations between melodic patterns of similar and dissimilar contour. Tests were designed in which pre-texted melodic contours were given treatments such as transposition, intervallic distortion, in tonal and atonal presentations. An ongoing concern with such studies is in the difficulty of proving whether selected variables are natural and therefore pertinent to any subsequent discoveries about music cognition. Fiske (1992) points out that this is a perennial hazard with any kind of research design that formulates test materials based on a preselected list of variables. The danger in presuming any necessity for a select list of variables for tests of music cognition decision-making may actually create an undesirable situation in which other variables, not selected, may in fact turn out to be crucial. For instance, pattern structure models identify 'melodic contour' as a central feature in pattern description and representation. However, there is a problem with selecting 'melodic contour' as a pattern variable which I think is hidden in an assumption that melodies literally move up and down. Since the notion of melodic contour is one of the particularities of Western musical notation (where melodies literally move up and down a musical staff), and by force of being a cultural specific, it casts doubt on an assumption that melodic contour is a natural (and therefore universal) feature of musical mental representation.

It is my view that such synaesthetic terms as colour, brightness or darkness of timbre, and contour are better thought of as metaphorical descriptors of the elusive musical acoustical signal. There is really nothing inherent in the pitch of a melody *per se* that physically goes up and down, so how it is conceived to have a parallel aspect in mental representation depends on a considerable leap of faith. It might be more productive to investigate the inter-cultural and crosscultural linguistic uses of synaesthetic musical descriptors in order to understand commonalities among the manifest images of music in various cultures. However, such a project may be more appropriate as a matter for an ethno-musicological investigation than for the development of music cognition theory.⁴ In any event, it has to be conditional upon the success of musical pattern structure research that experimental subjects understand, or even be taught the concept of melodic contour as an 'up and down' concept prior to being tested. If that is in fact necessary, and I think it is, then the purity of the test can potentially be violated. This may be getting a little off topic. My intention here is to question the inclusion of such features as melodic contour for testing aspects of music cognition, based on the point that such features are in fact representative of an APV-based ontology of music in which it is not so much a question of which variables are acceptable for experiments as it is a question of which are excluded.

In fairness to the research effort in pattern recognition, it should be noted that Fiske (1985), in a study of chronometric analysis, investigates the effect of various variables, including the affect of pitch and melodic contour perception on response time. Rather than presuming melodic contour to be a natural feature of music cognition (in contrast to Dowling and Harwood), he uses the notion of melodic contour as a *structural* variable for the construction of melodies for his experiment. Fiske then asks his subjects to identify any other perceived tonal or rhythmic discrepancies in the given melodies without resorting to the mention of contour. However, this does not dispel a nagging suspicion that a subject will usually only identify the tonal or rhythmic discrepancy *as* contour if the person is already acquainted with the concept. Nevertheless, Fiske does not succeed in shaking the old assumption that melodic contour of a whole melody need not be considered literally. He states that "perhaps a more realistic view is to consider the contour variable as a series of intervals, each specifying a direction" (Fiske, 1992: 364). The problem with justifying melodic contour.' The notion of intervallic

^{4.} Perhaps there is reason to argue that the two disciplines are somewhat interrelated.
'direction' still does not shed the cultural specificity issue with its inherent connection with Western musical notation. If a subject were to identify an intervallic leap as going in an 'up' or 'down' direction, there still would be no absolute assurance that the person had not been previously culturally imbued with the concept of intervallic direction.

I contend that this is essentially a domain demarcation issue because variables selected in the pattern structure model must by definition be restricted to the auditory-cognitive domain. On any level of testing, there has to be an element of pre-conceptualization on the part of the subject. The question is, does such pre-conceptualization come about through so-called 'natural' listening experience or through directed training (and subsequent listening)? Recall that, by the stipulations imposed by the APV, concept acquisition outside the strict auditory-cognitive domain is not actually deemed to be a part of music cognition. My criticism of this particular issue stems from the fact that experiments such as those mentioned above consistently make their selection of variables from an APV-based (and therefore conceptually restrictive) standpoint.

Dowling and Harwood (1986) shed some light on this issue. They suggest that there are differences in how inexperienced (untrained) and experienced (trained) listeners learn melodic patterns. They discovered that inexperienced listeners tend to learn melodies by individual intervals whereas trained listeners tend to group intervals as 'chroma' patterns. At present, I believe this is essentially an epistemological issue which cannot be solved by experimentation in the auditory-cognitive domain alone, because as of yet there is no convincing way to differentiate (nonauditory domain) conceptualization from (auditory domain) sensory experience.

4.5 The processing-rule model

The next generation of theoretical models in the historical evolution of CTM involves the development of what I shall call 'processing-rule' models. 'Processing-rule' models assume the existence in the mental apparatus of background or underlying protocols that administer the construction of musical patterns. It is the intention of processing-rule theories to deal with the

generic decision-making activity that underlies such activity as pattern construction. As such, processing-rule models attempt to describe the processes of mental activity rather than, as in the previously discussed theories, the products (i.e., images, mental correlates of sensations, etc.) of that activity.

There are four commonly-held principles on which processing-rule theories are based. The first is that music cognition is a process of the construction of mental entities (i.e., mental representations) rather than a process of the creation of aural replications or copies of the acoustic signal (e.g., Seashore). Recall that the copy paradigm of Seashore is based on the assumption that the percept resulting from the acoustic object is the same for all listeners. Processing-rule theories attempt to break the link between the acoustic object and the percept by bringing in the individual involvement of the listener as a central factor of music cognition. Meyer (1956) is an early example of a theorist who attempts to break away from the replication paradigm by introducing the notion that the listener's individual attentiveness and expectations have a causal effect on resultant cognition.

Processing-rule theories are generally divided into two areas: that is, theories based on the 'soft' construction paradigm and theories based on the 'hard' construction paradigm.⁵ The 'soft' construction paradigm takes a top-down approach in which the percept is invariant because it is presumed that the mechanisms creating it are also invariant. Any variation at the level of mental activity is said to be only partly influenced by the listener's musical experience and concomitant knowledge of musical styles. 'Soft' construction theorists (e.g., Shepard, Deutsch, Cuddy and Dowling) tend to group the percept and the resultant cognitive activity as all one process.

The 'hard' construction paradigm separates the sensory perception (invariant) component from the cognitive (variant) component. The 'hard' construction paradigm uses a bottomup approach in which the mentally constructed cognitive entity, rather than resulting from the percept created by the acoustical signal, is said to be caused by the acoustical signal triggering

^{5.} This distinction was made by Fiske (1992).

what Lerdahl and Jackendoff come to identify as "mental (cognitive) operations that impose order on information derived from that signal" (Lerdahl and Jackendoff, 1983: p. 370). It is presumed that the order imposed on the acoustic signal results in the creation of realized (i.e., variant) percepts and tonal-rhythmic patterns which are in part governed by the listener's unconscious knowledge of the tacitly-known rules of the particular musical idiom in question. Adherents to the 'hard' constructionist paradigm include Heller and Campbell, Serafine, Lerdahl and Jackendoff and Fiske. Their theoretical models shall be the focus of Chapters 5 through 8.

A second principle of processing-rule theory is that music cognition is (in one move) both defined and reduced to the organization and management of tonal and rhythmic patterns. For the 'hard' constructionists, this is a considerable raising of the base-line of investigative tonal-rhythmic material, from the days when isolated tones (e.g., Helmholtz, *et al*) were considered to be the paradigm unit of investigation.

A third principle of processing-rule theories is that there are basically two types of components in the wide array of tonal and rhythmic pattern relationships: first, those that are considered to be universal to all subjects; and second, those that are specific to a given musical idiom. In my view, the motive underlying this particular principle is to deflect potential criticism that cultural differences among the world's musics are not being taken into account by theorists operating within the 'hard' construction paradigm. The 'soft' constructionists say they have successfully fielded this criticism by embracing the differences in the world's musics instead of focusing studies on Western music.⁶

^{6.} My argument is against both paradigms because it has more to do with the issue of supervenience, as discussed in Chapter 3. The 'soft' constructionist paradigm, working within the restrictions of a set of assumptions based on a formalist aesthetic, cannot recognize and encompass all the possible differences in musical cultures unless restricted to the auditory component of the manifest image of music. For instance, a so-called extramusical association such as religious significance would, by definition, fall outside the musical-ontological realm as dictated by the APV. Even though cultural differences and similarities in musical style are given recognition in both the 'hard' and 'soft' construction paradigms, it must be remembered that only culturally different (so-called 'musical') formal musical components (e.g., tonal and rhythmic patterns, structure, etc.) are to be considered within the realm of CTM.

The fourth principle embraced by the 'hard' constructionist processing-rule paradigm is that innate mechanisms are shaped according to the cultural musical idiom embraced by the listener. In other words, music cognition is deemed to be an activity involving the construction of patterns which take their particular shape in relation to the specific musical idiom.⁷

4.6 Conclusion

This concludes my outline of the historical contextualization of the current state of CTM. In the next chapter, I shall outline and examine the 'processing-rule' (music as communication) model of music cognition put forward by Jack Heller and Warren Campbell. Their ideas, developed in the late 1970's and early 1980's, serve as an early example of the processing-rule model and have had a considerable influence on subsequent work done by Serafine, Lerdahl and Jackendoff and Fiske.

^{7.} This fourth principle amounts to an attempt to marry the manifest image to the scientific image experience of music. However, I have found nothing in the explanations of the various cognitivist theories that convincingly bridges the gap between the manifest and scientific images. Because of this deficiency, difficulties arise in terms of the differentiation of the *content* of generic decision-making activity: that is, how the mental apparatus is to differentiate between so-called 'musical' patterns and ordinary (i.e., so-called 'non-musical') sounds in the general acoustic environment. The categories of the manifest image, in terms of the APV, demarcate what is to be deemed 'musical.' In my view, that results not in an explanation of musical culture, but is simply an expression of Western (APV-based) cultural values.

Chapter 5

The Processing-rule (Music as Communication) Model

5.1 Introduction

In the previous chapter, I examined three historical paradigms of music cognition theory: the psychoacoustic model, the cognitive model and the pattern structure model. I also introduced and explained the principal features of a fourth and more recent processing-rule model. The model of music cognition put forth by Heller and Campbell (hereafter H/C) is as far as my research indicates, the first in a line of cognitivist theories of music which employs the concept of the processing-rule as a basis for theory development.

As I explained in the previous chapter, a processing-rule is an underlying grammatical protocol, unavailable to introspection, which governs the processing of tonal and rhythmic patterns in music. One special feature of this particular model is that, unlike psychoacoustic and pattern structure models, which focus on the products (i.e., sensations, images) of cognition, it endeavours to describe the processes of the decision making activity which is said to generate the products of cognition. Proponents of the processing-rule model, because their purpose is to investigate the background processes of cognition, prefer not to think of it as a displacement of previous models, but rather, to use Churchland's (1979) term, as a 'preservationist' model. Recall that preservationist models endeavour to retain aspects of the old (reduced) theory in the new (reducing) theory.

H/C's approach to music cognition theory adheres to the Fiskian (1992) notion of the 'hard' construction paradigm. As previously explained, the 'hard' constructionist paradigm makes no distinction between the invariant organization of auditory data occurring at the sensory level and the flexibility of organization which may be afforded from musical experience and knowledge at the cognitive level. Making such distinctions are not permitted on the 'hard' construction paradigm because doing so requires a separate classification of incoming auditory data as being either perceptual or cognitive. Recall that in terms of the 'hard' construction paradigm, all incoming auditory data is classified as 'cognitive.'

I shall organize the chapter by beginning with a discussion of the stated philosophical underpinnings of H/C's version of the 'processing-rule' model. In the next section, I shall summarize (through an examination of H/C's various writings) the pre-theoretical premises on which they formulate their model. Section 5.4 is a description of the processing-rule model itself. In the final section, I shall offer critical commentary on various issues which arise concerning H/C's theoretical premises and the features of the model itself.

5.2 Philosophical underpinnings

Briefly, H/C identify and adopt an alternative view of scientific theory which involves a conceptual shift from the Cartesian to the Humean to the Kantian point of view. In fact, H/C adopt a Humean version of the Kantian view and suggest several advantages to that view specifically in terms of what they call the "music communication process" (Campbell and Heller, 1980a: p. 29). H/C describe the shift from the Cartesian view to the Humean view as a formalization of the step Galileo took in what they call the "transposing [of] scientific questions from the world of common sense to the world of sciences' fictions" (Campbell and Heller, 1980a: p. 30).

In terms of the Cartesian view, the physical world exists *a priori* to its ultimate scientific explanation. The Cartesian view centres on the idea that an explanation of the physical world must ultimately be reducible to a description of *a priori* mathematical laws. In this sense, Descartes promotes a hypothetico-deductive (i.e., rationalist) model in which a given hypothesis is advanced, the results are logically deduced from it, and then those results are compared to empirical observation. The Cartesian view sees scientific theory as providing an idealized map of the so-called 'real world.' As scientific theory advances, its 'map' of the world is said to approach (and become a mirror of) the truth of the 'real world.' H/C describe this projection as an asymptotic curve in which scientific knowledge approaches the truth of the so-called 'real world' as a function of the time it takes to revolutionize scientific theory itself.

Recall that in terms of previous developments in CTM, Seashore (in adopting the Cartesian view) argued that the content and structure of musical experience at the mental level is in an isomorphic relation to the form and structure of the 'real,' vibrational world of music. For Seashore, the laws of the musical auditory signal are hypothesized as being in a mirror relationship to the mental correlates of musical perception. Consequently, Seashore deduces that an understanding of the laws of the musical auditory signal correlates to an understanding of the laws of the musical auditory signal correlates to an understanding of the laws of musical auditory signal correlates to an understanding of the laws of musical auditory signal correlates to an understanding of the laws of musical auditory signal correlates to an understanding of the laws of musical auditory signal correlates to an understanding of the laws of musical auditory signal correlates to an understanding of the laws of musical auditory signal correlates to an understanding of the laws of musical auditory signal correlates to an understanding of the laws of musical auditory signal correlates to an understanding of the laws of musical auditory signal correlates to an understanding of the laws of music cognition.

The Humean (i.e., empirical) point of view is at once positivistic and humanistic: that is, the source of knowledge is variously described as being 'based on,' 'coming from,' 'derived from,' or 'has its source in' human experience. H/C state that, in terms of the Humean view, "the events and objects identified in theory, and the relationship between them, are considered to originate in the observer" (Campbell and Heller, 1980a: p. 31). Continuing with the map analogy, the boundaries of the map (i.e., of scientific theory) are said to be imposed on the unknown (i.e., the 'real world') and may be edited as necessary to accommodate new oper-ationally-defined variables. In terms of musical experience, the Humean view places the listener in a situation in which she constructs her own perceived 'truth' of the musical stimulus by delimiting musical objects and by categorizing musical events according to her own accumulated musical experience.

The Kantian (i.e., interactionist) view, favoured by H/C, rejects a simplistic interpretation of the Cartesian and Humean views that knowledge is respectively either strictly innate or strictly empirical. The Kantian view promotes a synthesis of the Cartesian and Humean views, in the sense that knowledge is constructed through experience from certain general, albeit innate principles (or concepts). As the Kantian story goes, these *a priori* concepts provide the schemata for organizing sensory data. In terms of music cognition theory, the Kantian view inspires and impels H/C's theoretical model on the premise that music cognition is deemed to be a process of the organization of musical auditory data by virtue of pre-wired processing rules which are activated according to an individual's access to a particular musical culture.

One of the chief assumptions underlying H/C's model is that they posit a close relation between the cognitive processes involved in language and music. Music is deemed to be a form of human communication which, on one hand, is unlike language in terms of its capacity for conveying meaning, but on the other, is like language in terms of the kind of underlying (i.e., innate, non-introspective) mental processes and structures involved in its cognition. With this argument in hand, H/C take issue with Bennett Reimer, who claims (taking the formalist/expressionist point of view) that since reference is a necessary feature of language and since music does not have a system of language-like referents, "music, then, is not in any sense a language. It is neither a nonverbal language (such as numbers or musical notation or dots and dashes, etc.), nor an indefinite language nor a language of the emotions. For music as music lacks the essential characteristic of any language; its terms (sounds) cannot be defined or translated. Musical sounds are not conventional symbols" (Reimer, 1970: p. 32). Although a claim against the referential capacity of music may be countered on many levels,¹ H/C defend their argument by setting up a connection between language and music from a strictly formalist or rather, structuralist view of music.² In countering Reimer's objection, H/C state that "language is more than a reference system...while 'reference' may be considered a necessary attribute for defining 'language,' some consideration must be also be given to its unique structure before ruling that 'music...is not in any sense a language'" (Heller and Campbell, 1976: p. 41). H/C then make two crucial moves to strengthen their APV-based philosophical position. First, they claim that "the great power of language stems from the ascendancy of form over content" (Heller and Campbell, 1976: p. 42). Second, they delimit the discussion to the syntactic and structural aspects of language (and subsequently music). In making these two moves, H/C thus

^{1.} See Peter Kivy's Sound and Semblance: Reflections on Musical Representation (1984) as well as Stellings' Aspects of Reference in Music (1991) for detailed accounts of the referential aspects of music.

^{2.} H/C achieve this in part by borrowing from Langacker's (1968) thoughts on the syntactic or structural features of natural language.

establish a starting point for a theory of music cognition based on a linguistically framed concept of syntactic processing rules.

With the premise in hand that linguistic forms and structures have dominance over content (*à la* Langacker), H/C formulate a definition of music which they state "characterizes music as a formal system which is derived from the structural component of language" (Heller and Campbell, 1976: p. 43). Having established this close parallel between language and music, H/C elaborate on their definition of music by claiming that "music is a form of communication and the listener is, of course, a perceiver whose responses can be studied within the framework of a psychology of perception" (Campbell and Heller, 1980a: p. 31). In order to capture the special way they understand music also to be a form of communication, H/C borrow from MacKay's definition of 'communication'. MacKay states that

the meaning of a message can be defined very simply as its selective function on the range of the recipient's states of conditional readiness for goal-directed activity...Defined in this way, meaning is clearly a relationship between message and recipient rather than a unique property of the message alone. (MacKay, 1969: p. 24)

Based on the above distinction, H/C differentiate three 'messages,' or meanings, in the communication of a musical performance: first, the 'intended' meaning; second, the 'effective' meaning; and third, the 'conventional' meaning. The 'intended' meaning arises from the sender (i.e., the composer and/or the performer). In contrast to language, which principally involves the transmission of messages, H/C claim that there is an 'effective' component in musical communication. H/C state that 'effective' meaning is "evoked in a specific listener" (Campbell and Heller, 1980a: p. 34). H/C define 'conventional' meaning as being "determined on the basis of a consensus within a particular population of listeners" (Campbell and Heller, 1980a: p. 34).3

^{3.} For the purposes of this study, the third component holds particular interest because the major sticking point for CTM is to show how the music cognizing apparatus becomes acculturated, given that its design and operations are premised on a scientific-image supervenience base. I shall have more to say about this in Section 5.5.

In summary, H/C adopt a Kantian view synthesizing the Cartesian and Humean epistemological views, that knowledge is neither strictly innate nor strictly empirical. In terms of music cognition, the organization of empirical data is by virtue of pre-wired processing rules which are activated according to the particularities of an individual's access to a musical culture.

5.3 Pre-theoretical premises

As I proceed to outline the pre-theoretical premises of H/C's model, I shall follow their line of argument with a view to demonstrating how they create a rationale for the 'processing-rule,' 'music-as-communication' model of music cognition. I shall also attempt to demonstrate how this rationale is achieved both within the premises of the APV and within the scientific-image supervenience mode.

I have identified seven pre-theoretical premises (or claims) upon which H/C base their theoretical model. The first (and perhaps most crucial) move H/C make is to 'naturalize' music.⁴ This move emanates from their first claim that, contrary to such systems as the rules of chess or algebra, which are explicit (i.e., conscious, artificial, out-in-the-world, manifest), the rules for musical structure, as for language, are deemed as being *implicit* (i.e., unconscious, natural). H/C claim that musical performers "play 'by the rules', but do not have an explicit representation for the rules" (Heller and Campbell, 1976: p. 43), which parallels their cognitivist claim that native speakers of natural language initially and perhaps never have an explicit representation for the structures of their native language. This means that, according to H/C, humans have a natural and dedicated capacity to impose order and structure on the acoustical signal and to generate (as with sentences in language) an infinite variety of tonal and rhythmic patterns within the parameters of their experience with any particular musical idiom *as music*. H/C state that they view language "as an evocative process involving the shared cultural experiences of both performer and listener which we apply to the music communication process" (Campbell and Heller, 1980a: p. 33). In opposition to the use of sterile pre-fabricated

^{4.} I use the term, 'naturalize' in the sense that CTM generally takes music to be caused by innate features of the mental apparatus which are dedicated to cognizing music.

musical examples in experimental design, H/C are careful to give their model what they call 'ecological validity' by eliciting examples from what Neisser identifies as "real, culturally significant situations" (Neisser, 1976: p. 2). H/C state that "most studies are carried on outside of a musical context with stimuli that are a far cry from *natural* music" (Heller and Campbell, 1982: p. 8, my italics).⁵

H/C's second claim is that there is an inherent logic in the implicit sets of rules for both language and music. According to H/C, music listeners inherently 'know' musical syntax much in the same way native speakers implicitly are said to know (in terms of cognitivist orthodoxy) the order of adjectives. For example, inasmuch as a native language user would never express the word order in a given description as a "metal red nice lunchbox" (Heller and Campbell, 1976: p. 43), H/C conclude that even a child pianist would never end a song on the penultimate (dominant) chord. They state that is so because "the normal resolution of a phrase is a part of our internal structure for producing music" (Heller and Campbell, 1976: p. 43), based on an inherent, non-introspective set of processing rules which apparently prevents one from doing so.

H/C's third claim is elicited specifically in terms of the scientific supervenience model. They claim that "music (like language) is not of the 'real [manifest] world' but has its origins as a pattern in the brain of the sender, and is not constituted again until it is evoked as a pattern in the brain of the perceiver" (Campbell and Heller, 1980a: p. 31). According to H/C, the manifest existence of music is not only not given prior existence to its cognition but it is also not viewed to be in an isomorphic relation (à la Seashore) to music cognition. In setting up this parallel situation with music and language, they state that studies can be developed based on research in linguistics which

holds as an underlying premise that (for music) [as for language] the brain functions primarily as a pattern-generator and pattern-receiver. Furthermore, the model suggests that the processing of these patterns depends on implicit formal

^{5.} It is this claim for the *naturalness* of music (at both the scientific and the manifest levels) that is at the centre of my critique of CTM. The putting forth of a claim that there is a dedicated and naturally instantiated causal source for music amounts to an end run around those who claim (myself included) that music is a cultural construction. I shall elaborate on this point later in the chapter.

operations. That is, the aesthetic response to music is the result of a cognitive, intellectual process. (Heller and Campbell, 1976: pp. 44-45)⁶

H/C's fourth claim states that music cognition consists of a process of solving complex, abstract problems which have to do with the identification, discrimination, evaluation and analysis of formal tonal and rhythmic pattern relationships. In reinforcing the thesis of natural human musical capacity, H/C make an empirically-based claim that aesthetic response among both trained and lay listeners does not vary to any great degree, in the sense that musically trained listeners may exhibit a quicker, but not necessarily higher scoring ability on tests of musical intelligence. This is so because H/C claim (looking forward to Lehrdahl and Jackendoff) that the implicit sets of rules for music have a close relation to the aforementioned postulated sets of cognitive processing rules for language. They state that "the musical auditory patterns and their symbolic representations must be processed in much the same manner as verbal auditory patterns, or language symbols" (Heller and Campbell, 1976: p. 46). H/C describe the sequence of formal pattern analysis (for both music and language) as a melding of perception and cognition. The sequence of operations involves such performative aspects as context choice, expectation formulation, question framing, data gathering, data analysis, question and expectation comparison, and context revision. (See Heller and Campbell, 1982: p. 9)

The above point leads to H/C's fifth claim that the sets of implicit rules for music (similar to comparable sets of rules for language), operate on two processing levels, identified as the 'micro-structure' and the 'macro-structure' levels. H/C state that the 'micro-structure' is often referred to as "the 'interpretive' element in music" (Heller and Campbell, 1976: p. 46), which encompasses such nuance-like features in music as "stresses within phrases, or changes of timbre within notes" (Heller and Campbell, 1976: p. 47). H/C state that the 'macro-structure' level "deals with melodic rhythmic, harmonic, and other formal elements symbolically as well as aurally" (Heller and Campbell, 1976: p. 46). H/C criticize Reimer's (1970) quasi-

^{6.} This firmly establishes an articulated cognitivist position in which the APV is claimed to be a natural feature of music cognition. It is the 'naturalizing' of the APV that is at the heart of my critique of CTM.

formalist view of music as being too narrow, because of his implication that only the 'macrostructure' level ought to be included in a discussion of the formal aspects of music. However, H/C propose a broadening of Reimer's view to include the 'micro-structure' level as well. This move on the part of H/C both formalizes and naturalizes the nuances of music, certainly in terms of performance and interpretation. However, H/C concede that as of the writing of their 1976 article, there was no effective notation system in place and not even an effective means of measuring the cognition of musical nuance. Until a system is devised to describe and measure systematically the interpretive aspects of music, they recommend that theoretical models should be developed in anticipation of that eventuality.⁷

H/C's sixth claim is that the social/cultural contract among composers, performers and listeners arises naturally, by virtue of the shared implicit knowledge contained in the aforementioned sets of processing rules for music. By way of illustration, H/C propose that a good rationale for the continuance of music education into the twenty-first century would be that the explicit formal relationships learned through music will better enable students to acquire skills in other areas. For instance, second language study (by virtue of the similar design of the implicit processing rules for music and language) would be made easier by the study of music.⁸ H/C make a somewhat debatable claim that up to now, music has not been an essential part of our cultural experience, or of our educational experience, for that matter. However, with the research effort that they propose (and by adopting an instrumentalist view of music education), they state that "music will then not only be an essential part of our cultural experience, but also of our educational experience" (Heller and Campbell, 1976: p. 48). Thus, H/C create a two-fold rationalization for both a science-based effort in music cognition research and a science-inspired design for curriculum development in music education.

^{7.} My research does not indicate that there is such a system in place as of this writing.

^{8.} I am not sure how this heightened proclivity could come about, since H/C have already clearly stated that on an empirical bias, direct instruction does not have a significant effect on results on musical intelligence. I shall have more to say on this point later.

H/C's seventh pretheoretical claim is that the child acquires the above-mentioned (cognitivist) social/cultural contract before the age of five. In the early years of child development, the co-authors claim that the cognitive apparatus (upon which I shall elaborate shortly) acquires the mental capacities for both music and language, and in doing so, creates the implicit processing-rule structures appropriate to the task. H/C state that these mechanisms are in place by the age of five "for the implicit processes involved in the decoding of language and music stimuli. Components for feature analysis, category assignment and generalization, and category normalization should be included" (Heller and Campbell, 1982: p. 13). H/C define 'category normalization' as "the process by which a listener connects an intended message in one context with the same intended message in another context" (Heller and Campbell, 1982: p. 13), such as retaining the meaning of an utterance among different speakers or interpreting a melody as the same melody when played by different instruments. With the seven pretheoretical premises in place, my next task will be to outline the principal features of H/C's particular version of the 'processing-rule' model.

5.4 Description of the processing-rule model

The theoretical model proposed by H/C describes a cognitive mechanism consisting of four components made up of the auditory sensors, a processor, memory, and an executive. H/C set up four contingencies for the conceptual framework of the model. First, they state that the model is "functional rather than structural...no reification is considered" (Heller and Campbell, 1982: p. 9). Second, H/C state that the 'processing-rule' model is founded on the Humean view that "we know nothing of substances or ultimates in the world" (Heller and Campbell, 1982: p. 10). Third, they state that the model (in addition to the Humean view) specifies a Kantian/Piagetian requirement that "we are born with a set of anticipatory schema which become manifest in early childhood" (Heller and Campbell, 1982: p. 10). Fourth, they state (adding to the Kantian view) that the model specifies that "neither the schemata nor the knowledge gained from experience tells us of the world, however, they are merely consistent

with survival in the world of our native culture" (Heller and Campbell, 1982: p. 10). However, as I shall indicate shortly, the processor is deemed by H/C to be "aware" of the world.⁹

There are two developmental stages in the model's design. The first stage takes into account the infant up to the age of two and the second stage in cognitive development represents the stage from two years to adulthood. The postulation of two stages of cognitive development rationalizes the emergence of the so-called 'executive' function in the second stage.

In the first stage, H/C state that genetically encoded programs (which H/C variously refer to as 'concepts' and/or 'anticipatory schemata') do the work of "specifying context rules which determine sensory expectations" (Heller and Campbell, 1982: p. 10). H/C claim that the system of encoded programs is "predisposed to ask questions related to basic category decisions, such as the nature of the source of stimulation: 'Is it human or nonhuman?'" (Heller and Campbell, 1982: p. 10). If the results of the initial input analysis prove to be compliant with expectations, the system then makes tentative category assignments. The range of decisions may take the form of what H/C categorize as "feature analysis, category assignment and generalization, and category normalization" (Heller and Campbell, 1988: p. 13). H/C define 'category normalization' as "the process by which the listener connects an intended message with the same message in another context [such as]...the conservation of interpretation category across musical instruments [when playing the same melody]" (Heller and Campbell, 1988: p. 13). If the results are not compliant with expectations, H/C state that the concepts (i.e., anticipatory schema) are then modified and "become part of the habitual response set" (Heller and Campbell, 1982: p. 10).

H/C raise two points of concern in terms of how the reader is to interpret the design of the model. The first point concerns the relation between the sensors and the 'processor.' H/C stipulate that the configuration of the sensors and the kind of analysis the sensor outputs perform is dependent upon the choice of context as determined by the 'processor' (i.e., the

^{9.} This is a considerably difficult point which will receive more attention in Section 5.4.

particular set of 'anticipatory schema'). Another way of expressing the above is to say that the configuration of the sensors (that is, what we hear on the musical surface) is supervenient upon the particular set of implicit rules in place at any given time in the life of the 'processor.' According to H/C, 'context dependency' has specified parameters. I shall elaborate on that shortly. Let H/C's explanation suffice for now that such factors as "spatial localization, noise rejection, and spectral sensitivity all give evidence for the active participation of cognition in the process of hearing...[and] the questions asked by the sensory system correspond to the operationally defined variables of scientific inquiry" (Heller and Campbell, 1982: p. 10).¹⁰

The second point of concern has to do with the specific descriptions of and the relation between the 'processor' and the 'executive.' H/C state that the 'processor' performs such tasks as operating on the data provided by the sensors and transforming and decoding that data "into the most likely of many possible messages" (Heller and Campbell, 1988: p. 12). Most interestingly, the authors state that the processor "is *aware of the world* and shifts contexts in response to the information provided by the senses" (Heller and Campbell, 1988: p. 12, my italics).¹¹

In terms of the issue of 'executive awareness,' H/C stipulate that the 'executive' component "has an entirely different kind of awareness. It is deemed to be aware of itself, and of some of the processing that goes on within itself (introspection), and is also aware of the output of the processor. Only limited communication is possible between the processor and the executive" (Heller and Campbell, 1988: p. 12). Thus, the 'executive' has no access to the intricacies of the processing strategies carried on by the 'processor,' or for that matter, to the raw sensory data itself. H/C state that the 'executive' "receives a strongly edited, second-hand version of current events" (Heller and Campbell, 1988: p. 12). H/C stipulate that they "want

^{10.} I shall elaborate in more detail in Section 5.4 the various effects the scientific supervenience view has on the validity of the theoretical model.

^{11.} I shall elaborate on this point in Section 5.4, specifically in terms of so-called 'processor awareness' and 'listening context.'

to avoid applying words like conscious and unconscious to this model primarily because few people ask 'Conscious of what?'" (Heller and Campbell, 1988: p. 12).¹²

This completes my description of H/C's 'processing-rule' model. In the next section, I propose to deal with the three important issues raised in terms of the model, namely, H/C's various spins on the notion of music as communication, the notion of contextual dependency, and the relation between the scientific image music and the notion of awareness.

5.5 Critical commentary

5.5.1 An APV-based notion of music as communication

It is important to point out at the outset that H/C's definition of musical communication is an APV-based notion. H/C delimit the idea of musical communication as being within the auditory-cognitive domain and involving an unbroken line of the transmission of a musical work from the composer to the performer and finally to the listener. Adhering strictly to the APV, they claim that "since music is typically a-referential, we cannot look to the manipulation of non-musical objects and events by the listener to provide evidence for musical communication" (Campbell and Heller, 1980a: p. 34). Two items in the above statement affirm H/C's APV-based belief and come to the reader in the form of assumptions: first, that music is "typically a-referential" and second, that what is "non-musical" is that which lies outside the boundaries set by the APV. However, H/C do understand that average listeners do not possess the same music communication skills as skilled performers. Nor, for that matter, do average listeners possess the same level of communication skills in music as they do in language. To that end, H/C set up the following caveat. They state that

responses in the form of musical performances could serve as indicators of successful communication, but the average listener in our culture is not a skilled

^{12.} Contrary to the above claim, I would suggest that many people in the field of cognitive science are battling with questions about the issue of consciousness and inquiries in fact focus on explaining the relation between 'content' and consciousness. If in fact, as H/C suggest, the 'processor' is "aware of the world," and the 'executive' is "aware of itself," its own processing, and of the 'processor,' the reader deserves an explanation as to how this situation comes to pass. The reader also deserves to know H/C's views on the matter concerning the content of musical 'awareness.' I shall have more to say about this in Section 5.4.

performer. When the investigation is directed toward the typical listener, we face the problem of a context-dependent, culturally-determined communication process that produces minimal overt response and is based upon a nonintrospective implicit rule system. (Campbell and Heller, 1980a: p. 34)

Thus, for the average listener, acquired skill is not deemed to be a determinant of successful musical communication, but rather listening ability is said to arise from that which is passively absorbed under the influence of culturally-determined contextual factors. However, as I shall describe shortly, since H/C define the notion of 'contextual dependency' within the strict limits imposed by the formalist stipulations of the APV, they operate within a restricted set of conditions. This brings me to a problem buried in the block quote above, which centres on an apparent contradiction H/C make that music is deemed to be "typically a-referential," but that so-called "context dependency" is purported to result in a *proper* cognition of music because of a resultant "appropriate" acculturation of the listener. One wonders how musical acculturation can be a-referential when it seems more the case that acculturation is inherently referential. Acculturation would seem to *require* an individual to refer to non-APV based factors (e.g., listening location, performance situation, etc.) in the contextualizing a given musical passage¹³

As well, there seems, at first glance, to be an explanatory gap between the proposal for the listener's so-called dependency on listening context (and his/her experience in a particular cultural milieu) with the ensuing proposal for a cognitive model which is based on a "nonintrospective implicit rule system." In short, the question arises as to how H/C are going to provide a convincing explanation how the listener makes effective use of so-called contextual and cultural factors within an a-referential aesthetic framework (i.e., APV-based) and also within an implicit, non-introspective, rule-based model of cognition. I shall pursue this question in the next section.

5.5.2 An APV-based notion of context dependency

In their article, *Studying the Communication Process in Music* (1988), H/C explore three theses. First, they argue (on p. 34) that neither the notational nor the vibrational component of

^{13.} In the next section, I shall give a fuller exposé of this problem in terms of H/C's definition of 'contextual dependency.'

music provide a sufficient basis for studying the so-called 'music communication process.' Second, they argue that music is not to be considered as an entity but rather as an intended communication by a composer or performer. Third, they claim that the hypothesized communication process from composer to performer to listener is dependent upon certain implicit (although shared) conventions of members of a common musical culture. H/C refine the notion of conventions as 'context dependencies.'

H/C begin their explanation of 'context dependencies' by stating that "context dependencies change the value or interpretation of an event without a corresponding change in the so-called objective characteristics of an event...or conversely, a change in context may require a different event in order to conserve an effect" (Campbell and Heller, 1988: p. 36). To fortify this point, they refer to a study in linguistics by Ladefoged and Broadbent (1957). In that study, different sets of speaker characteristics were used in the enunciation of a sentence in order to observe the variations in listener response to vowel perception of similar sounding words (e.g., bit, bet, bat). It was found that a variation of response to the perception of vowels in a word (bit, bet, bat) occurred when different versions of a synthesized sentence was presented. H/C refer to the above result as the 'one-stimulus-for-many responses' paradigm.

For an example of the reverse 'many-stimuli-for-one-response' paradigm, H/C refer to a study in stop consonants (Liberman, et al, 1959) in which they state that "it was demonstrated that different sound transitions were required for each vowel context in order to evoke the same listener response" (Campbell and Heller, 1988: p. 38). H/C argue that such studies illustrate and prove their hypothesis for a rule-based subjective cognitive construction model. They state that "at least with regard to speech it is clear that we should adjust our vocabulary: we do not 'hear' speech sounds, we process them, and the processing rules are in part culture-dependent" (Campbell and Heller, 1988: p. 38).

In terms of the above model of language cognition (and equally in terms of a subsequent model of music cognition), H/C claim that the 'processor' takes in data from the sensors and "applies rules appropriate to the established cultural context" (Campbell and Heller, 1988: pp.

38-39), and sends the results to the 'executive.' Therefore, if for example, the 'processor' were to gather spoken data from speakers with different accents, the kind of processing it would perform would be referred to in the linguistics literature as 'categorical perception.'

As far as I can judge (in terms of linguistic response), H/C's delimiting of the terms 'contextual dependencies' and 'cultural context' extends only to those particular variations in listener response which are attributable to syntactical features located exclusively within the realm of spoken speech patterns. Those variations in response are deemed in turn to have a direct effect on the operation of the 'processor.' In other words, 'context dependencies' and 'cultural context' are defined in terms of the formal (i.e., syntactical) characteristics of linguistic sound patterns which may be particularly affected by a person's accent or use of sentence structure. For convenience, I shall call this version the 'narrow' interpretation of 'cultural context.' I define a 'wide' interpretation of 'cultural context' (unacceptable to H/C) as taking into account *all* contextual factors (including those in the auditory realm), such as gestural factors (e.g., hand movements, facial expressions, body language, etc.).

In terms of music, a 'narrow' interpretation of 'cultural context' would similarly be limited to those factors within the auditory-cognitive realm. H/C give two examples to illustrate their espoused 'narrow' view of 'context dependency' which are specific to Western music. They state that

in spite of its inevitable sforzando as a percussion instrument, in our culture the piano is most often used as a continuous tone instrument; in most contexts we ignore the extreme decrescendo and hear it as a continuous tone instrument. If the frequency of a violin tone is changed in a step-wise sequence, we hear pitch changes; if, however, the frequency changes periodically over a narrow range at about six cycles per second (as in vibrato) no pitch change occurs. The distinction is one of timbral change. (Campbell and Heller, 1988: p. 42)

The conclusion I come to, according to the above quote, is that so-called 'shared cultural conventions' between listeners and performers have only to do with conventions of hearing (i.e., strictly within the auditory-cognitive realm). Thus, the notion of cultural sharing among participants is in effect defined by H/C as an APV-based concept. In other words, the so-called 'music communication process' is also deemed to be limited to the auditory-cognitive

domain. On this line of argument differences among performances, such as subtle alterations of phrasing or dynamics (within the acceptable limits of a given style) are communicable if they remain within the limits of a 'narrow' interpretation of 'contextual dependency' as defined.

As I have said, a 'wide' interpretation of 'context dependency' would include any and all factors connected to a musical performance, such as related historical, cultural and ideological meanings, expressions of emotion, musical representations, etc., as well as including the auditory-cognitive factors embraced within the 'narrow' interpretation. A 'wide' interpretation would therefore be unacceptable to H/C because, within the limits set by the APV, factors outside the auditory-cognitive realm are by definition deemed 'nonmusical.'¹⁴

Being critical of any potential 'wide' interpretations of 'context dependency,' H/C argue that "there are still, unfortunately, many studies undertaken which employ amusical contexts and then generalize their results to music" (Campbell and Heller, 1988: p. 43). To this end, H/C refer to R. Cogan in his book, *New Images of Musical Sound* (1984), who states that we must allude only to the sonic realm for considerations of musical context. Cogan says that

the essential sonic features of any musical instrument are to be found in the sum total of its structural sonic contributions to musical contexts. These features will be revealed by analyzing the functions and relations of those contexts and of the instruments in creating them. (Cogan, 1984: p. 145)

Let us examine what effect a 'narrow' interpretation of 'context dependency' has on the requirements of H/C's theoretical design. Since the music processor, as defined, must (and is limited to the capacity to) deal with data received only from the auditory sensors, and since it operates by virtue of sets of implicit processing rules which are in themselves activated solely by auditory data, and since the executive can deal only with the analyses provided by the music processor, the operation of the whole musical cognitive design must, by force, be restricted to being a formally operational system, both in terms of the data being processed and in terms of the procedures and products of the processing itself. H/C's design simply cannot (and will not) account for so-called 'amusical' data. For these reasons, we can say that the

^{14.} H/C use the term, 'amusical.'

design of the model is strictly internalist. It is doubly so in the sense that contextual interpretation is restricted to those contexts specified by the formal properties of the musical acoustical stimulus and that any resultant representations produced by the system are generated by internal formal processes, or put simply, that which is in the auditory-cognitive domain. The notion of 'context' does not include the wider range of considerations which would be afforded by a 'wide' interpretation. This dual internalist thrust (and its explicit rejection of a 'wide' interpretation of context) stems from an adoption of the APV as a basis for defining music.

With this in hand, H/C's next move is to 'naturalize' the APV. This is achieved by creating a design of cognitive structures on the scientific level that align with the parameters set by the APV on the manifest level. In terms of understanding how this 'naturalizing of the APV' relates to the manifest/scientific image dichotomy, the reader must first recall that H/C first set up a formalist manifest image of music under the dictates of the APV. Then a scientific image of music was created in terms of hypothesized cognitive structures which deal only with the kind of information provided within the auditory-cognitive domain. H/C's final move is to turn it all around and claim that said cognitive structures have causal powers, thus 'naturalizing the APV.' H/C's argument closes with the conclusion that 'music' is a formally conceived entity that is clearly *caused* by cognition, thus establishing a basis for theory-making within the scientific-image supervenience mode.

5.5.3 The scientific image and awareness

With the model being described in terms of the scientific image of music, the processingrule design then provides a clear and easy framework for explaining the quantification and analysis (i.e., the cognition) of so-called 'musical' data. Contextual factors in the auditory signal, as defined by H/C, are said to contribute to the configuration of the sensors. As we saw, the choice of context is the job of the processor, and as defined, the processor operates at a level unavailable to introspection (more on that shortly). Following constructivist lines, H/C state that such performative features of the cognitive apparatus as "spatial localization, noise rejection, and spectral sensitivity all give evidence for the active participation of cognition in the process of hearing" (Heller and Campbell, 1982: p. 10). Thus, it is the processor that makes the final decisions as to what data in the whole auditory spectrum is to be treated specifically as 'musical' auditory data. The sensory system then, is said to operate at a 'micro-level,' involving the measurement of sonic variables such as pitch, loudness, spatial location, temporal factors, etc., converting the acoustical stimuli to appropriate forms of data for subsequent processing.

Thus, the operation of the system, described in this way, illuminates the assumed scientific-image supervenience mode. This is so because up to and including the point of transfer of output from the processor to the executive, processes not available to consciousness in effect constitute 'music cognition.' However, H/C's interpretation of the notion of 'awareness' needs to be addressed. I propose this because of H/C's a claim for the existence of two kinds of 'awareness' in the cognitive design; that is, 'processor awareness' and 'executive awareness.'

As described in Section 5.3, the processor has its own brand of 'awareness.' The following is a summary of HC's description. H/C state that the processor "is aware of the world and shifts contexts in response to the information provided by the senses" (Heller and Campbell, 1982: p. 12). H/C claim that the executive has an entirely different kind of awareness. The executive is said to be aware of itself, and of some of the processing that goes on within itself, and it is also aware of the output of the processor. H/C claim that only limited communication is possible between the processor and the executive. The processor is able to indicate the results of its processing to the executive, but not the strategies it uses for processing the 'raw' sensory data. In fact, according to H/C, the kind of data the executive receives is a strongly edited, second-hand version of events. (Summarized from Heller and Campbell, 1982: p. 12.)

Based on the above description of the respective roles of the processor and the executive, it would seem that the notion of 'awareness' is deemed to be an internally generated matter, and that the content of 'awareness' is essentially a projection of the processor. In this sense, it would seem that so-called 'executive awareness' depends largely upon what the

processor sends it. In this sense, I take the notion of 'awareness' to be essentially a selfreferential notion, being primarily concerned with the data being processed and/or analyzed and being markedly unconcerned with the broader external environment. H/C's explanation conflicts with an intuitive notion of 'awareness,' which I suspect is in some important way connected with the manifest image of the world.

However, it must be noted that H/C describe 'awareness' specifically in terms of the scientific image. This leads me to suspect that a similar problem persists here as in the previous section. At first glance, it is difficult to conceive of a processor or an executive (having the specifications as described by H/C), described as functional components in the cognitive apparatus, as being aware of anything. My suspicion is that H/C's use of the term 'awareness' is very specific, but does not relate to an intuitive interpretation of the term. From an intuitive point of view, one might take H/C's description as a bit of anthropomorphizing in the same way that we often speak in interpersonal terms about computers and automobiles. This is a case in which a category which belongs intuitively to the manifest image is being appropriated to describe a process and/or functional component in terms of the scientific image. Intuitively, the notion of 'awareness' seems to require the presence of a person. However, H/C are actually guilty of Cartesian dualism because it seems that the processor acts as a kind of homonculus, supervising its own (and the executive's) operations. This goes against the materialist orthodoxy of cognitive science which purports to have solved the dualism problem. A materialist cognitive ontology, by definition, should not permit a functional component in the cognitive apparatus to have the powers of a homonculus.

The brand of 'awareness' H/C describe is founded on the artificialities inherent in an ontology based on the APV (manifestly described). That is, even a superficial examination of the intuitive relation (manifestly conceived) between 'awareness' and the intentions implied in adopting the APV requires a virtual elimination of all contextual effects coincidental with musical experience. This is at best an artificial situation and requires a considerable suspension of disbelief. I shall conclude this section by saying that the project of defining of categories in

the scientific image (motivated by the assumptions inherent in a scientific-image supervenience based conceptual framework) is misconceived (and make a bad fit) if the categories thus defined are to be derived from the manifest image.

5.6 Conclusion

Heller and Campbell's contribution to the development of CTM is significant. Their work is notable because they made the conceptual leap designating perceptual activity (and its concomitant sonic stimulus data) to an instrumental role. It set the stage for subsequent theorists to focus attention on developing functionally-described cognitive models. This in effect cleared the way for the 'music as cognition' hypothesis, which promotes the conditional that the ontology of music is best to be described in terms of the formal processes and structures of cognition. In terms of the manifest/scientific image dichotomy, this move succeeded in firmly establishing the scientific-image supervenience base as an ontological conceptual framework for music. As a result of H/C's work, it has become generally accepted in the CTM project that the manifest image of music (as a cultural entity) is deemed to be supervenient upon scientificallydescribed cognitive processes.

In the next chapter, I shall examine the work done by Lerdahl and Jackendoff in terms of the 'generative music grammar' model. To a large degree, their work in CTM builds upon the premises established by Heller and Campbell. Theirs is a 'two-component' theory which attempts to reconcile the wide variety of stylistic differences in musical idioms with generic cognitive structures and processes. In essence, Lerdahl and Jackendoff's contribution to CTM amounts to an attempt to explain the tonal music of Western culture as supervening upon the musical cognitive processes of listeners imbued in that musical culture.

Chapter 6

The Generative Musical Grammar Model

6.1 Introduction

In Lerdahl and Jackendoff's book, A Generative Theory of Tonal Music (1983), they formulate a model of music cognition which is roughly a synthesis of Chomsky's theory of linguistic generative grammar and Schenker's deep level structure theory of tonal music. Lerdahl and Jackendoff's (hereafter L/J) theory of a 'generative musical grammar' is another version of the 'processing-rule' model. Recall from the previous chapter that H/C's processing-rule model assumes the existence of implicit rule sets which underlie the mental construction of musical tonal-rhythmic patterns. L/J's model moves another step along the cognitivist road toward the complete internalization and isolation of music cognition. The co-authors' hypothesize that a 'generative musical grammar' does the work of "specifying a *structural description* for any tonal piece; that is, the structure that the experienced listener infers in his hearing of a piece" (L/J, 1983: p. 6).

As with H/C's model, that of L/J's adheres to the 'hard' construction paradigm (as defined by Fiske, 1992) in which music, rather than residing in the acoustical signal itself, is a mentally constructed entity. Therefore, according to L/J, music is a mental construct which results from an acoustical (read 'musical') signal triggering what they describe as "mental (cognitive) operations that impose order on information derived from that signal" (L/J, 1983: p. 370). Recall that on the 'hard' construction paradigm, the order that is imposed on the acoustical signal results in realized percepts and tonal-rhythmic patterns, governed by what Fiske describes as the "implicitly known rules of a culturally determined music system" (Fiske, 1992: p. 366). As explained in Chapter 5, 'hard' constructionists may or may not distinguish between presumed invariant organization of auditory data occurring at the sensory level and the presumed flexibility of organization which may be afforded from the musical experience and knowledge of the listener. However, the story concludes that any distinctions permitted on the 'hard' construction paradigm tend to result in separate classifications of musical material as

either perceptual or cognitive. Recall that 'soft' constructionists group perceptual and constructive activity as one cognitive process.

At the beginning of A Generative Theory of Tonal Music (hereafter GTTM), L/J summarize

the essential features of the 'generative musical grammar' model. They state that their theory is

formulated in terms of rules of musical grammar. Like the rules of linguistic theory, these are not meant to be prescriptions telling the reader how one should hear pieces of music or how music may be organized according to some abstract mathematical schema. Rather, it is evident that a listener perceives music as more than a mere sequence of notes with different pitches and durations; one hears music in organized patterns. Each rule of musical grammar is intended to express a generalization about the organization that the listener attributes to the music he hears. The grammar is formulated in such a way as to permit the description of divergent intuitions about the organization of a piece. (L/J, 1983: p. xii)

Following the general plan of CTM, the rules of the 'generative musical grammar,' providing the listener with the organizing principles of music cognition, are pointedly said to be unavailable to introspection. L/J state that the organizing principles for music cognition are no more available to consciousness than "the principles governing the ability to speak, walk, or see" (L/J, 1983: p. xii). In this sense, L/J follow a similar line of argument as H/C, that music is a natural feature of the mind, as one component in the whole set of natural human intuitions. Based on this premise, L/J grant primacy to the scientific image of music, in the sense that their explanation of the manifest image of music is made in terms of a cognitivist model. As I shall explain later in the chapter, the naturalization of music proposed by L/J is hypothesized on the shoulders of an APV-based musical ontology.

6.2 Philosophical underpinnings of the model

6.2.1 Chomskian mentalism

L/J begin with a Chomskian-derived assumption of a pre-wired existence of mental entities or structures which are particular to the act of music cognition. L/J state that "a formal theory of musical idioms will make possible substantive hypotheses about those aspects of musical understanding that are innate: the innate aspects will reveal themselves as 'universal' principles of musical grammar" (L/J, 1983: p. 4). There are two types of processing rules in the 'generative musical grammar' model. The first type is described in terms of universal cognitive structures (i.e., 'well-formedness rules') which are said to be commonly instantiated in the music cognizing apparati of all listeners. L/J define the 'well-formedness rules' as those which "specify [all] the possible structural descriptions" (L/J, 1983: p. 9). The second type is described in terms of relativistic cognitive structures (i.e., the 'preference' rules) each listener possesses according to his/her listening experience in a particular musical idiom. L/J define the 'preference rules' as those which "specify out of [all] the possible structural descriptions those that correspond to experienced listeners' hearing of any particular piece" (L/J, 1983: p. 9). According to L/J's stipulations, their idealized listener (that is, one who has expert-level listening expertise in a given musical idiom) possesses a complete working set of the 'preference rules' for that idiom.

L/J's model of music cognition reveals a strong Chomskian influence, in the sense that all humans are said to possess a set of so-called innate 'deep structure' cognitive principles for music (as well as for language). Based on this premise, L/J create an argument for the existence of a generic set of innate cognitive principles which enables humans to comprehend the diverse characteristics of the many styles of music in the world. They call this set of cognitive principles the 'generative musical grammar.' In essence, L/J's project is really a search for a complete set of musical universals which will in turn result in the formulation of a complete set of generic processing rules which will ideally be applicable to all musical idioms. To this end, the coauthors state that "a formal theory of musical idioms will make possible substantive hypotheses about those aspects of musical understanding that are innate; the innate aspects will reveal themselves as 'universal' principles of musical grammar" (L/J, 1983: p. 4).

L/J define 'musical universals' as the "innate aspects of mind that transcend particular cultures or historical periods" (L/J, 1983: p. 282). Indicating respect for the empirical side of the story, they claim that a final clarification of the 'musical grammar' will finally be possible only through an ongoing study of the body of works in tonal music. The examination of a large number of tonal works is deemed to motivate an ongoing revision of the 'preference rules' in

order to account for musical instances which L/J state "do not conform to predictions of the then-current set of rules. In such circumstances we were forced either to invent a new rule or, better, to come up with a more general formulation of the rules we had" (L/J, 1983: p. xii). Thus, to a certain degree, the model has built-in pragmatic aspects, based on an inductive approach to the formulation of an idealized set of 'preference rules.'

6.2.2 The idealized listener

L/J's 'idealized listener' is distinguished from the Humean notion of the expert listener, whose skills are honed by practice. Recall (from Chapter 5) that the Humean notion of 'experience' embraces the idea that acculturated listeners at all levels of experience gain in listening expertise both by listening and by direct study. However, L/J take a more restrictive view of the notion, 'musical experience,' at the same time reinforcing the APV as a central element in their model's conceptual framework. They state that

an acculturated listener need never have studied music. Rather we are referring to the largely unconscious knowledge (the "musical intuition") that the listener brings to his hearing...occasionally we will refer to the intuitions of a less sophisticated listener in organizing his hearing of music, but in a more limited way. In dealing with especially complex issues, we will sometimes elevate the experienced listener to the status of a "perfect" listener—that privileged being whom the great composers and theorists presumably aspire to address (L/J, 1983: p. 3, L/J's parenthesis and quotation marks)

Thus, according to L/J, the direct formal study of music does not contribute in any significant

way to musical knowledge. They state that

a musical idiom of any complexity demands considerable sophistication for its full appreciation, and listeners brought up in one musical culture do not automatically transfer their sophistication to other musical cultures. And because one's knowledge of a musical style is to a great extent unconscious, much of it cannot be transmitted by direct instruction. (L/J, 1983: p. 4)

L/J do in fact admit that a question will arise as to the role of directed learning in stating that "one may rightfully be curious about the source of the experienced listener's knowledge. To what extent is it learned, and to what extent is it due to an innate musical capacity or general cognitive capacity?" (L/J, 1983: p. 4). Nevertheless, according to L/J, the so-

called "learning" of a musical idiom is understood not to be a result of direct instruction, but rather to be a process of continual refinement of the set of 'preference rules' (for any particular musical idiom). This learning is said to be achieved solely through musical listening experience. As such, L/J's concept of the 'idealized listener' (i.e., the expert listener in a particular musical idiom) is premised on stipulations provided for in the APV. In doing so, this move is a crucial step in creating a rationale for the naturalization of the APV.

6.2.3 A constructionist definition of music

In keeping with cognitivist orthodoxy, L/J's definition of music is formulated on a constructionist view. Their intention is to place music theory within the discipline of cognitive psychology alongside the more traditional areas of vision and language. Prior to defining music, L/J set up certain conditions. First, in stating that "music is a product of human activity" (L/J, 1983: p. 2), L/J set up a condition for an object-based definition of music. The second condition is that music is not to be interpreted as a fact of external existence. L/J state that music is not simply "the raw uninterpreted physical signal…not a musical score…not a performance" (L/J, 1983: p. 2). L/J claim that music theory (read 'cognitivist' theory) is not concerned with "performers activities…nor is it concerned centrally with the sound waves the performers produce" (L/J, 1983: p. 2).

Based on the argument that music does not exist out in the world as an acoustical signal, a performance or a score, L/J define "a piece of music [as] a mentally constructed entity, of which scores and performances are partial representations by which the piece is transmitted" (L/J, 1983: p. 2). Going by the stipulations of this definition, the manifest image of music (i.e., performance activity, scores, the sounds themselves) is not granted status in reality. According to L/J (and as with the other models examined in this study), the reality of music is to be understood as a cognitive entity described in terms of the scientific image.

6.3 Pre-theoretical axioms and limitations

Although some of the following material appears in the previous section on the philosophical underpinnings of L/J's theoretical framework, this section will serve to provide a more concise summary of the assumptions and limitations underlying L/J's theoretical model of a 'generative musical grammar.' I identify ten points in total, five axioms and five limitations.

6.3.1 Axioms

L/J set out five axioms (i.e., facts) they believe to be true about music. First, (as previously noted) they claim that a piece of music is ontologically "a mentally constructed entity of which scores and performances are partial representations by which a piece is transmitted" (L/J, 1983: p. 2).

Second, L/J propose that music is a pancultural and distinctly human activity. Because music is so varied, they argue that it cannot be subjected to standard methods of (Western) notational analysis.¹

The third axiom of L/J's model states that an individual's total exposure to music (i.e., accumulated listening experience) is by definition equal to his/her listening ability. The opening statement of *GTTM* (previously cited) leads to the co-authors' hypothesis that an increased ability to listen *with understanding* is accomplished in part by a concomitant intuitive ability to

^{1.} I shall have more to say about this point in my critical remarks, but suffice it to say for now that the particular music L/J choose for analysis is selected from the repertoire of Western tonal masterpieces and the method of examination of those pieces is roughly based on Schenkerian analysis. Schenkerian analysis is a methodology which is well-served for certain musical repertoire (i.e., selected works of eighteenth and nineteenth century tonal music). However, since the usefulness of Schenkerian analysis is limited to particular types of tonal works, its methodology prevents it from being successfully applicable to musical genres which do not have a tonal centre at all. See Chapter 9 and 10 for more detailed examinations of that point. I will be making a claim that the design of the 'generative musical grammar' model has limited applicability for two reasons: first, based on the intrinsic limitations of Schenkerian analysis and second, based on L/J's ill-fated premise that the laws of analysis for tonal music (which are in themselves derived from self-limiting Schenkerian analysis) can be re-applied to nontonal idioms on the basis of L/J's claim that the 'preference rules' for tonal music have universal properties.

impose structure on the acoustical data of a particular musical genre and in part by the repeated exposure (in terms of listening experience) to a particular musical idiom.

The above point ties neatly with the fourth axiom which states that prolonged and intense exposure to a particular musical idiom is necessary for musical understanding to occur. L/J claim that a "formal theory of musical idioms will make possible substantive hypotheses about those aspects of musical understanding that are innate; the innate aspects will reveal themselves as 'universal' principles of musical grammar" (L/J, 1983: p. 4).

The fifth axiom, and in agreement with the theoretical paradigm proposed by H/C (and Serafine), is that humans hear music as organized patterns (as opposed to individual, discrete and unrelated sounds), realized as gestalt-like groupings in units of multiple components. To this end, L/J state that "one speaks of music as segmented into units of all sizes, of patterns of strong and weak beats, of thematic relationships, of pitches as ornamental or structurally important, of tension and repose, and so forth" (L/J, 1983: p. 2).

6.3.2 Limitations of the theory

L/J identify five points of limitation for their proposed thesis. First, they state that the 'generative musical grammar' model is not concerned with a description of the steps the processing rules take in a "the listener's real-time mental processes, [but rather] we will be concerned only with the final state of his understanding" (L/J, 1983: pp. 3-4).

Second, L/J state that their work in *GTTM* is preliminary to "an eventual theory of musical cognitive capacity" (L/J 1983: p. 4) which will purportedly take into account a description of the mental products produced for *all* musical genres.

Third, L/J state that the model proposed is not an attempt to give a structural description of every possible piece of tonal music. They stipulate that their model is rather an attempt to define and "specify a *structural description* for any tonal piece, that is, the structure that the experienced listener infers in his hearings of the piece" (L/J, 1983: 6, L/J's italics).

Fourth, the 'generative musical grammar' model does not attempt to discuss the role of affect in music cognition. L/J state that they "hope to provide a steppingstone toward a more interesting account of affect than at present can be envisioned" (L/J, 1983: 8).²

The fifth theoretical limitation in the model is stated by L/J that a "comprehensive theory of music would account for the totality of the listener's intuitions. Such a goal is obviously premature. In the present study we will for the most part restrict ourselves to those components of musical intuition that are hierarchical in nature" (L/J, 1983: p. 8).³

6.4 Description of the model

The 'generative musical grammar' model consists of four central components: 'grouping structure,' 'metrical structure,' 'time-span reduction' and 'prolongational reduction.' In the interests of efficiency, I have taken the liberty of making direct quotes of the co-authors' descriptions of each component:

1)*Grouping structure* expresses a hierarchical segmentation of the piece into motives, phrases, and sections. (L/J, 1983: p. 8).

2)*Metrical structure* expresses the intuition that the events of the piece are related to a regular alternation of strong and weak beats at a number of hierarchical levels. (L/J, 1983: p. 8)

3) Time-span reduction assigns to the pitches a hierarchy of "structural importance" with respect to their position in grouping and metrical structure. (L/J, 1983: p. 8)

4)*Prolongational reduction* assigns to pitches a hierarchy that expresses harmonic and melodic tension and relaxation, continuity and progression. (L/J, 1983: pp. 8-9)

^{2.} A short commentary is pertinent here. There is a danger in abstracting out the affective component (as it is presumed L/J do) because it implies a potentially untenable assumption that the musical analysis activity of the cognizing apparatus and musical affect are compartmentalized. The revealing fact remains, however, that L/J's assumption in this regard bears the hallmarks of the APV, which deems affect to be a 'nonmusical' response. If L/J's intention is to give a final-state description of musical understanding, a proper account may be deficient in failing to embrace certain affective aspects which may accompany it.

^{3.} Again, as with my remarks on musical affect, I have to take issue with the segmentation in musical intuition implied by L/J. A comprehensive theory of music is premature if a segmented design (which segregates 'formal' from 'nonformal' features) underlies the theoretical agenda.

The listener is deemed to have the capacity to attribute musical structure along a scale of coherence by means of two sets of operating rules, which L/J refer to as *well-formedness* rules and *preference* rules. L/J define these two sets of rules as follows:

1) Well-Formedness rules specify possible structural descriptions. (L/J, 1983: p. 9)

2) Preference rules designate out of possible structural descriptions those that correspond to experienced listeners' hearings of any particular piece. (L/J, 1983: p. 9)

This completes my presentation of the salient features of the 'generative musical grammar' model. The following section is reserved for critical commentary of several issues which arise in respect to the model.

6.5 Critical commentary

6.5.1 The auditory perception/music cognition paradigm

The auditory perception/music cognition paradigm (hereafter AP/MCP) dominates, as with H/C's 'processing-rule' model, the 'generative musical grammar' model. In terms of the AP/MCP, music cognition must, by design, consist of a two-step process which connects the auditory sensing mechanism to the deep structure (i.e., unconscious) 'musical grammar.' The key to the success of the AP/MCP depends upon the adoption of the APV which, as has been described, stipulates that only the formal properties of the musical acoustic signal (i.e., the tonal-rhythmic patterns, formal structure, etc.) comprise what is to be deemed 'musical.' On this basis, mental activity outside the auditory-cognitive domain is considered to be 'nonmus-ical.'

Furthermore (in terms of the AP/MCP), cognition which is determined to be 'musical' is limited to the creation of only those mental constructs which can be created solely from the (unconscious) processing of the so-called 'musical' perceptual data (i.e., tonal-rhythmic acoustical data). L/J stipulate that, in terms of the AP/MCP, a mathematical relationship underlying the structure of a piece of music must be categorized as 'nonmusical.' L/J state that

"one can imagine some mathematical relationship to obtain between every tenth note of a piece but such a relationship would be in all likelihood be *perceptually irrelevant and musically unenlightening*" (L/J, 1983: p. 2, my italics). While it might be agreed that certain relationships outside the AP/MCP domain may be indeed perceptually invisible, I would disagree that such relationships are 'perceptually irrelevant' and certainly never entirely 'musically unenlightening.' The important question is whether such types of relationships are really *cognitively* irrelevant and therefore, as L/J state, "musically unenlightening." L/J's view on this matter emanates directly from an APV-based musical ontology. In Chapter 9, I propose to demonstrate that while the auditory perceptors themselves may not require knowledge of so-called 'nonmusical' relationships, the information derived solely from the auditory signal may actually be insufficient for a full and proper understanding of much music. I will make a case that concepts always figure into music cognition. This will of necessity involve an abandonment of the APV. A definition of what is considered 'musical' will of necessity have to be considerably broadened beyond the limited constraints of the AP/MCP domain, a move which will in turn result in a definition of music within the broader context of human experience.

Later in this chapter, I shall examine L/J's remarks concerning the cognition of contemporary music with a view to illuminating the unnecessary restrictions imposed by theorizing in terms of the AP/MCP and the APV. In terms of much music (and perhaps all music), but extremely pertinent to twentieth-century Western art music, L/J's adoption of the APV as a basis for musical ontology imposes unreasonable epistemological constraints upon the listener. Recall that the APV stipulates that the proper appreciation of works of fine art is unmediated by contextual factors. I claim that this stipulation is in conflict with the conceptual framework of much twentieth-century art music, much of which in fact deprioritizes perception. In many cases, a full and enriched involvement with complex pieces of avant-garde twentieth-century music cannot be achieved unless certain so-called 'nonmusical' relationships are known by the listener and became integrated in the epistemological basis for listening.

I wish to stress that the force of my general argument in this study does not hinge upon the twentieth-century musical idiom, since, in my view, a wider epistemological base for listening could potentially apply equally well to any number of musical examples from any period or any genre. My central point of argument here is that is that it is incorrect to assume that knowledge and concepts outside the AP/MCP fail to qualify as contributing factors for music cognition.

6.5.2 The Schenkerian analysis paradigm

L/J claim (in pre-theoretical axiom number two) that music, as a pancultural and distinctly human activity, cannot be subjected to standard methods of (Western) notational analysis. I take that claim to be a reference to standard Common Practice Period (hereafter CPP) harmonic/melodic analysis. Nevertheless, the fact remains that L/J do employ and rely rather strongly upon the Schenkerian method of analysis for much of the potency of the 'generative musical grammar' model. Since Schenkerian analysis is itself, by definition, a form of notational analysis, L/J must have a certain agenda for making the second claim. I shall try to tease out their intentions.

On one hand, L/J imply that for structural analysis they do not totally rely upon Schenker's approach but rather go to a deeper level for analysis, and consider Schenkerian analysis as occupying a somewhat complementary role in their theory. To this end, they state that

many interesting treatments of motivic-thematic processes, such as...aspects of Schenkerian analysis, rely on an account of what pitches in a piece are structurally important. In the present study we show how the notion of structural importance depends on more elementary intuitions concerning the segmentation and rhythmic analysis of the musical surface; thus we offer a firmer foundation for the study of artistic questions. We consider our work to complement rather than compete with such study. (L/J, 1983: pp. 7-8)

However, there is evidence which points to the need for a revision of the above claim. In Chapter 5 of *GTTM*, *Introduction to Reductions*, L/J do in fact reveal a stronger connection between theirs and Schenker's analytical approach than they have conceded to in the above statement. The co-authors give an example of a situation that occurs in variation form and/or
improvisations on given themes in which they claim that the listener has a natural capacity to relate each variation to a central theme. They state that this is so "because the listener relates them, more or less unconsciously in the process of listening, to an abstract, simplified structure common to them all...in all these cases, the listener or performer has an intuitive understanding of the relative importance of pitches" (L/J, 1983: p. 106). L/J explain that, in such cases, "if a pitch is heard as ornamenting another pitch, it is felt as structurally less important than the other pitch—it is subordinate to the other pitch. In short, the pitch relations involved in these situations are hierarchical" (L/J, 1983: p. 106).

Schenkerian analysis comes into the picture at this point. L/J state that although knowledge of the principles of pitch hierarchies has been shared by music theorists for hundreds of years, "it was especially the insight of the early twentieth century theorist Heinrich Schenker that the organization of an entire piece can be conceived in terms of such principles, and that such organization provides explanations for many of the deeper and more abstract properties of tonal music" (L/J, 1983: p. 106). The extent of the closeness of the relation between Schenker's and L/J's analytic approach becomes clearer with the enunciation of the *Reduction Hypothesis* in which L/J claim that "the listener attempts to organize all the pitch-events of a piece into a single coherent structure, such that they are heard in a hierarchy of relative importance" (L/J, 1983: p. 106). A full clarification of the now admitted close relation of L/J's reduction analysis technique to Schenker's approach appears in L/J's claim that

this hypothesis is central to Schenkerian analysis and its derivatives...A consequence of the claim is that part of the analysis of a piece is a step-by-step simplification or *reduction* of the piece, where at each step less important events are omitted, leaving the structurally more important events as a sort of skeleton of the piece. In Schenkerian theory, the steps closest to the musical surface are called "foreground," and successive steps lead in turn to "middleground" and "background" levels. (L/J, 1983: p. 106)

The Schenkerian notions of 'foreground,' 'middleground' and 'background' levels effectively provide the basis for L/J's formulation of the *Strong Reduction Hypothesis*. L/J define the *Strong Reduction Hypothesis* in two parts. They state that

a. Pitch events are heard in a strict hierarchy.b. Structurally less important events are not heard simply as insertions, but in a specified relationship to surrounding more important events. (L/J, 1983: p. 106)

L/J then elaborate on the advantages of the Strong Reduction Hypothesis which they

claim

leaves three areas of freedom in fleshing out what constitutes a proper reduction of a piece: (1) what the criteria of relative structural importance are, (2) what relationships may obtain between more important and less important events, and (3) precisely what musical intuitions are conveyed by the reduction as a result of 1 and 2. (L/J, 1983: p. 106-107)

At this point, I wish to reiterate that Schenkerian analysis is a particularly (albeit restrictively) effective tool for in the formal analysis of certain types of pieces in the tonal music idiom. Recall that inasmuch as L/J make a claim for the universality of so-called 'deep-level processes' based on the results of their analysis, they also clearly state that their intention is to focus on a description of the mental products generated by tonal music in particular, and more specifically, they intend to refrain from discussing any other genre of music other than Western classical pieces of the CPP. L/J claim that what they learn about the cognition of Western classical tonal music can readily be applied (with the application of new style-specific 'preference rules') to other genres. Concerning this point, the co-authors state that

specifically, we present a substantial fragment of a theory of classical Western tonal music (henceforth "tonal music"), worked out with an eye toward an eventual theory of musical cognitive capacity. Our general empirical criteria for success of the theory are how adequately it describes musical intuition, what it enables us to say about the nature of tonal music and of music in general, and how well it dovetails with broader issues of cognitive theory. (L/J, 1983: p. 4, L/J's parenthesis)

However, the catching point that emerges from the above statements is that L/J's version of the 'processing-rule' model pivots on salient features of Schenkerian analysis. Schenker's notion of the *Ursatz* is defined as a principle of 'fundamental structure,' made up essentially of a tonic-dominant-tonic harmonic progression which supports a linear melodic motion to the tonic note. It must be noted here that the notion of the *Ursatz* is itself predicated

on the APV because in Schenkerian theory only the formal/perceptual properties of music are deemed 'musical,' and thence pertinent to a proper discussion of music cognition.

Therefore, I claim that the design of the 'generative musical grammar' model is predicated upon two self-limiting assumptions. First, the model, being largely predicated on the Schenkerian model, is in itself applicable only to a very limited musical genre. Second, since the Schenkerian model portends to offer a solution to the understanding of music, and is itself predicated on the APV, any new theory built upon a Schenkerian model will by force exist under similar restrictions and limitations.

I grant that for the purposes of a strictly formal analytical approach to tonal pieces of music from the CPP, Schenker's and L/J's models each may have considerable internal validity. However, my complaint is that, in terms of being universally applicable to all musical idioms, both approaches have questionable external validity because of their respective methodological biases. More importantly, because of the way in which Western classical tonal pieces themselves happen to be structured, there is an abiding risk that the analysis will be prejudiced, in the sense that L/J's analytical results may just be a self-fulfilling prophesy. In turn, the results of such analysis may bear negatively on the design of L/J's theoretical model. That is because the model's internal form is in a state of continual development in terms of the establishment of new 'preference rules' developed exclusively through subsequent analyses of tonal works. The result is that it puts into jeopardy L/J's claims for the eventuality of the (promised) universal set of processing rules.

Furthermore, there are ample counter-examples to disprove the situation as described by L/J. For instance, there is less concern in the music of Varèse (and Xenakis) with the kind of tonal and rhythmic hierarchies that are so important to and prevalent in Western classical tonal music. In their music, spatial or timbral features are in some senses structurally more important than pitch and rhythm. I contend that unless a listener, (whose experience may be limited to the tonal musical idiom) *knows* how such music is structured apart from mere listening, a proper understanding *cannot* be achieved through the listening process alone. In terms of the 'generative

musical grammar,' the so-called processing rules previously activated solely by tonal music listening experience would be ineffective for the analysis of music which may be primarily spatially- and/or timbrally-based. Not only would the existing rules not do a proper job of analysis, they would very likely commit the unforgivable by misrepresenting the music. We do not get a convincing explanation from L/J as to how this problem would be rectified. I will have more to say on this shortly, in terms my critique of L/J's approach to the cognitive analysis of contemporary music.

6.5.3 Analysis of contemporary music

L/J's remarks on the cognition of contemporary music reveal in sharp focus some of the fundamental problems that persist with the 'generative musical grammar' model. As I understand it, the central problem with L/J's model is that it sends a mixed message as to *which* innate processes are pre-wired (i.e., as a pre-experiential endowment in the form of the 'well-formedness rules') and as to *which* innate processes are activated (i.e., as an experiential and idiom-specific development in the form of the 'preference rules'). By following L/J's step-by-step explanation of how the cognizing apparatus would operate in an encounter of contemporary music, we shall see that *all* the processes (i.e., the rules and reductions) the co-authors call into the picture appear to be from the latter group.

Throughout *GTTM*, L/J strongly imply that the organizational structuring that goes on for tonal music is paradigmatic (and therefore, natural) for any musical idioms having a basis vaguely resembling tonal music. I am lead to this conclusion because L/J fail to demonstrate (with examples) how the cognizing apparatus might develop idiom-specific 'preference rules' for any particular contemporary musical idiom. According to the tenets of L/J's theory, new 'preference rules' are established on an empirical basis. This seems to be in keeping with the coauthors' opening statement in *GTTM*, in which they promise to give "a description of the musical intuitions of a listener who is experienced in a musical idiom" (L/J. 1983: p. 1). Instead, the co-authors explain how the cognition of a piece of contemporary music would occur by referring only to the particular sets of 'preference rules' and 'grouping' techniques the listener is reputed to have established in terms of the tonal idiom.⁴ In doing so, L/J make their own argument uncertain. The reader must now ask whether L/J are promoting a thesis which states that the hierarchical organization using the 'preference rules' and 'groupings' set out for tonal music are necessary (and possibly sufficient) for the cognition of *all* musical idioms. Perhaps L/J are promoting a potential cause for a kind of "auditory blindness" a listener is reputed to experience when listening to a musical idiom which may rely upon a system of organization that is unrelated to her accumulated listening experience. Since L/J's (APV-based) model is restricted to operating within the auditory-cognitive domain, the co-authors so-called 'idealized listener' is going to be hard pressed to overcome those disadvantages.

I shall elaborate on that in more detail shortly, but first I wish to insert a caveat concerning L/J's treatment of so-called "contemporary music." Let it be said that the range of styles, methods of composition and artistic frameworks in twentieth-century music are all far too wide and varied to be treated as a single idiom, which L/J tend to do. Also, it is unfortunate that in their remarks on contemporary music, L/J make no mention of specific pieces to reinforce their argument, or even of specific twentieth-century musical idioms. It is true that L/J do make a comment in passing about probabilistic, aleatoric and serialist methods, but the unfortunate result of that is simply to encourage the reader to group those compositional techniques (which, in some circumstances, might be considered idioms unto themselves) under the general rubric of a single musical idiom: that of contemporary music. An extension of the above point is that it is unfortunate that no attempt is made to offer any distinctions among the methods mentioned in terms of potential explanations to the *cognition* of such music. Without suggesting that the co-authors are giving short shrift to a whole century of music, it is odd that L/J appear to expedite their discussion on twentieth-century music rather than offer potentially

^{4.} These groups of rules and techniques are manifested in the sets of rules and groupings described throughout the text of *GTTM*. The reader is subtly lead to conclude that tonal music listening is somehow a prerequisite for twentieth-century music listening.

valuable and detailed insights into its cognition, especially since Fred Lehrdahl is a composer and Ray Jackendoff is a practising musician.

As an example of L/J's somewhat prejudicial view of contemporary music, they state that "we understand there is now a pocket computer that can store and play back tunes. Since the tunes are stored numerically, one can take the square root of a tune and play that back! We doubt, however, that such 'transformations' are musically very useful" (L/J, 1983: footnote 8, p. 342). I am not sure how one could, as L/J state, "take the square root of a tune" in any event, but it is unfortunate that the co-authors make such a questionable and somewhat prejudicial value judgement concerning contemporary music, because it negatively infects their thesis.

To proceed with the discussion concerning L/J's description of how the fictitious cognizer deals with a piece of contemporary music, I shall quote L/J's concluding statement. In this case, the conclusion to the co-authors' argument will be instructive in revealing the logic of their argument as it unfolds. L/J state that

all of this discussion [on contemporary music] presupposes that the listener uses the principles of musical cognition set forth in our theory for structuring his perception of such [contemporary] music. One might alternatively suppose that he is using different principles. What might these principles be? One possibility is that he is somehow capable of inferring the organization that the composer, through his compositional method, has consciously built into the piece. For example, a composer might use statistical principles of molecular motion to determine compositional choices. We find it unlikely that the listener can hear according to such radically different principles. (L/J, 1983: p. 298).

As I implied earlier, there is a presupposition in the above statement that the listener must use the organizational processes as prescribed by the 'generative musical grammar' specifically in terms of tonal music, and that the hearing (i.e., understanding) of a piece is not affected in a positive way by conceptual (read 'nonmusical') knowledge of compositional intentions.

As indicated earlier (in the description of the model), L/J hypothesize the existence of (as the result of accumulated musical listening experiences) two generic sets of rules to be employed by the listener's cognizing apparatus: the 'well-formedness rules' and the 'preference rules.' On the surface this would seem to be a good starting place from which to develop the particular sets of idiosyncratic processing rules necessary for the processing of each musical idiom as encountered by the listener. Strangely, however, for the cognition of contemporary music, L/J claim that the cognizing apparatus must call into play the 'preference rules' previously established specifically for the cognition of tonal music, thus making the implied assumption that the listener must listen to contemporary music *in terms of* the tonal idiom. In L/J's description of the analytical process of a fictionalized piece of contemporary music, none of the rules and reduction processes the cognizing apparatus employs seem to work. L/J conclude that this will inevitably result in the cognitive inaccessibility of the contemporary idiom.

There is a certain implied set procedure (in terms of the rules and reduction processes) within which the cognizing apparatus must operate. The music cognizing apparatus must first employ the 'preference' and 'time-span' rules, which serve to determine pitch centres and/or cadential formulae (which, according to L/J, it cannot find). This step reveals L/J's unstated assumption that all musical idioms must have pitch centres and cadential formulae. When that fails, the apparatus then shifts to employing the process of 'prolongation reduction' to determine areas of tension and relaxation based on (melodic) pitch and harmonic factors. In failing to locate those, the music cognizing apparatus then resorts to locating rhythmic, dynamic and timbral factors which may be operative instead. In point of fact, the order of the above procedure reveals L/J's unstated assumption that similar hierarchies exist in all musical idioms. The next step the cognizing apparatus takes is to shift over to the 'metrical well-formedness rules' in an attempt to organize patterns of phenomenal accents in the musical surface in the fictitious contemporary piece. Once more, the apparatus fails because regular and hierarchically organized metrical structure does not exist in some idioms of contemporary music. Postulating the above as a necessary step in the analytical procedure reveals more about L/J's unstated (and incorrect) assumption that organized phenomenal accent must be a necessary feature of all music.

Finally, the music cognizing apparatus is said to resort to the employment of the 'grouping rules' to establish some sort of hierarchical organization. It fails once more in this

effort because, according to L/J, the evidence for grouping judgements is predominantly derived from local detail in contemporary music, and therefore provides an insufficient basis for proper and 'normal' multilevel grouping. Again, L/J seem to be implying that music must have an hierarchical organization. In short, none of the aforementioned rules which (presumably) work so well for tonal music are seemingly up to the task of properly cognizing the fictitional piece of contemporary music.

It seems that the music cognizing apparatus, in its failed attempt to organize contemporary music by means of the rules and procedures customarily used for tonal music, is doomed from the start. However, in demonstrating the inappropriateness of using tonal-music standards for listening to certain contemporary idioms, L/J also reveal (unwittingly) the inappropriateness of designing a model for music cognition in terms of the APV. Since a great deal of twentieth-century music has been composed as a pointed criticism of the ideals of the APV (and all it represents in terms of eighteenth and nineteenth-century music), it is not surprising that L/J's model will fail to be up to the task of providing a satisfactory result for twentiethcentury musical idioms. Rather, the model is rather at best capable of fulfilling its own prophesy of being useful strictly for the auditory organization of Western tonal music.⁵

On the surface, it would seem that L/J's theoretical model is a manifestation of a thesis promoting the "naturalness" of tonal music (and its cognition), and by implication, the "unnaturalness" of contemporary music. In fact, there are three specific instances in *GTTM* in which L/J reveal a musical/analytical prejudice in that direction. These three remarks also reveal central problems with the 'generative musical grammar' model itself.

The first instance occurs with L/J's remark concerning pitch organization in contemporary music. They state that "even when there is a tonal center, much contemporary music does not offer a coherent measure of relative pitch stability; much of it denies a tonal center altogether" (L/J, 1983: p. 296). The above statement begs the question of the necessity of (tonal

^{5.} I specify "auditory organization" because APV-based models do not recognize conceptual organization, for example, as one of many possible means to the apprehension of music.

music idiomatic) pitch stability as a feature of musical composition (and its concomitant "naturalness"). However, L/J do not take into account that pitch stability is in fact achieved in twelve-tone serial technique without requiring a single tonal centre because, by definition, the selection and ordering of pitches (and resultant stability) is predetermined by the selected order of tones in the row. However, as I shall demonstrate in Chapter 9, the notion of pitch-centre is not an *a priori* artistic requirement of many twentieth-century idioms, effectively rendering useless a music cognizing apparatus which is purportedly designed to search for it.⁶

Second, in a statement concerning rhythmic organization, L/J state that in much contemporary music "a regular metrical hierarchy is often not conveyed, even if the music is notated in traditional terms" (L/J, 1983: p. 296). The problem of question-begging persists in terms of the necessary existence of (tonal-music idiomatic) regular metrical hierarchies (e.g., groups of 2, 3, or 4) in musical composition (and as an experientially-derived element in music cognition). However, L/J do not take into account the fact that metrical hierarchies *are* in fact achieved in certain contemporary idioms using the Fibonacci series, for example (the unending sequence 1, 1, 2, 3, 5, 8,13, 21, 34....). The perception (and concomitant cognition) of the musical entities using the Fibonacci series is readily achieved in its lower end, up to and including the first six digits of the series, both in terms of pitch or rhythmic structures.⁷

^{6.} Arguments which follow the line that twelve-tone music is impossible to "hear" anyway, are, in my view, weak. The paradigms for listening changed so much within the time of the CPP that a listener in Gabrieli's time might have had extreme difficulty with or might have even failed to "hear" highly chromatic late nineteenth-century compositions by Wagner, Strauss or Schoenberg. Contemporary listeners usually have little difficulty making sense of such music. There are many listeners in the late twentieth-century who have no difficulty in "hearing" the pitch organization in twelve-tone music. Directed ear training can effect positively a listener's capacity to organize *any* music, but especially twelve-tone music. This, of course, is outside the strict perceptual stipulations provided for by the APV, and therefore, according to L/J *et al*, not a matter for discussion. For an illuminating discussion on the hearing of atonal music, see Forte (1973, etc).

^{7.} In Chapter 9, I shall demonstrate that rhythmic organization in some twentiethcentury idioms can be ordered within conceptual frameworks which do not adhere to the specific notion of rhythm that is characterized by Western tonal music.

Third, the question of postulating (tonal-music idiomatic) 'grouping structure' as a necessary (and therefore "natural") element in the music cognizing apparatus is begged in terms of a remark L/J make concerning the cognitive analysis of motivic structure in contemporary music. L/J state that "through extreme motivic 'transformations' or even the avoidance of motivic content, much of this [contemporary] music withholds evidence for structural parallelism that would lead to any rich hierarchy of grouping structure" (L/J, 1983: pp. 296-297). In making this claim, L/J do not give credit to Webern and Schoenberg who make significant advances concerning the notion of motivic transformations, especially in their work on serial matrices. Their compositions may not necessarily adhere to the motivical standards of the tonalmusic idiom, but they nevertheless do create their own, as L/J express it, "rich hierarchy of grouping structure." L/J offer no explanation or description of the kind of rules and grouping procedures which might take Webern and Schoenberg's music into account. The unstated implication is that there are none to be had.⁸

On the basis of L/J's remarks on the cognition of contemporary music, it would seem that the co-authors beg the question concerning the tonal-music idiomatic "naturalness" of pitch and rhythmic hierarchies because for some twentieth-century musical idioms, the traditionally conceived notions of pitch, rhythmic and motivic hierarchies may not appear to exist in a form (at least on an apparent level at the musical surface) which is cognizable by an (instructionally) uninformed but (acoustically) experienced listener. As noted earlier, other factors such as timbre and spatial factors may be at the forefront of artistic concern in terms of certain twentiethcentury musical idioms. However, L/J view it as their task (and by extension, the task of their archetypal "universal music cognizer," that is, the idealized listener) to identify pitch, rhythmic and/or motivic hierarchies even when there may be none, intended or perceived. Concerning this point, the co-authors state that, in terms of contemporary music, "the listener will infer less hierarchical structure from the musical surface. As a result, nonhierarchical aspects of musical

^{8.} In Chapter 9, I discuss the approaches to grouping structure devised by Varèse and Xenakis, which provides a richness which far surpasses the accomplishments of composers in the tonal idiom.

perception (such as timbre and dynamics) tend to play a greater, compensatory role in musical organization" (L/J, 1983: p. 298). As I have alluded earlier, the above statement continues to beg questions on two counts: first, the nonhierarchical status of timbre and dynamics and more importantly, the hierarchical structure of music in general.

As a counter-example to the above claim, Stockhausen's principle of 'general serialization' (in which every element in a composition is serialized) is one of the hallmarks of twentieth-century musical thought, because it succeeds in completely eliminating hierarchies in a musical composition. It is important to remember that the principles of serialism were motivated at least in part by the desire to create a new artistic movement in reaction to (and in opposition to) the hierarchical characteristics of the nineteenth-century European tonal idiom.⁹

It may be an accepted matter of fact that hierarchical organization applies well to traditional Western tonal music (in terms of music of the CPP as well as to Western-style popular music) but agreement is not unanimous that hierarchical organization is in fact a universal feature of all music (and by extension, a universal feature of the cognition of music). It is important to note that L/J do not even speculate whether a listener, exclusively imbued in a particular contemporary musical idiom, would or could develop (or activate, on the innateness model) a completely different set of organizational cognitive principles (hierarchical or nonhierarchical, according to need).

In terms of the type of cognitive analysis of musical idioms which may have little or no relation to traditional Western tonal music, the question still persists as to why the music cognizing apparatus would or should operate in terms of such organizational activities as 'timespan reduction' in order to establish pitch hierarchies in the context of rhythm, or 'prolongational reduction' in order to assign pitch hierarchies in the context of harmony and/or melody. As I have noted, there seems to be an overriding assumption (even as much as 'timespan' and 'prolongational reduction' processes occur with consistency across most, if not all examples of Western tonal music), that the above-mentioned processes are cognitively

^{9.} I deal with this issue in more detail in Chapter 9.

universal—that is, that a listener's music cognizing apparatus would (and must) operate according to the structural organization explicitly described in the 'generative musical grammar' model, no matter what the musical idiom.

However, I claim that a full and proper cognition (i.e., apprehension, appreciation, understanding) by a listener of many forms of twentieth-century music (and potentially any other musical idiom, or that matter) may *only* begin to be possible by adopting an epistemological mix of composer intention (i.e., conceptual knowledge) and listening experience (in addition to other factors outside the realm of the AP/MCP, such as the awareness of historical/cultural context, etc.). However, L/J insist that maintaining a legislative distinction between the effects of composer intention and listening experience upon the processes of music cognition is necessary. This insistence, of course, is entirely in keeping with the APV. To this end, the co-authors claim that

the relevance of this distinction to the description of tonal and serial music pertains with equal or greater force to probabilistic methods of composition, to aleatoric methods, to serialism extended to the rhythmic dimension, or to any other procedures that do not directly engage the listener's ability to organize a musical surface. In each of these cases, the gulf between compositional and perceptual principles is wide and deep: insofar as the listener's [listening]abilities are not engaged, he cannot infer a rich organization no matter how a piece has been composed or how densely packed its musical surface is. (L/J, 1983: p. 300, my italics)

Thus, the listening act is deemed to dominate music cognition and precludes any part in the process which may be played by factors outside the realm of the AP/MCP. There is a strong implication in the above that if the listener were to employ the same techniques as the composer does for his own listening, such listening would not be deemed to exclusively constitute "musical" listening, and such activity would therefore not qualify as music cognition.

6.5.4 Conclusion: the musical grammar, naturalism and behaviorism

In my view, L/J's countering statement to those who would disagree with the claim at the end of the previous section is misleading. It also deflects the argument in a manner which is confusing. The co-authors state that suppose someone were to deny this distinction ['between the principles by which a piece is composed and the principles by which it is heard' (p. 300)] and to claim that any arbitrary method of composition can create organizations that may become cognitively salient to a listener with sufficient exposure. To be sure, one's ability to structure input improves with exposure; this is implicit in our idealization to the experienced listener. But the assertion that exposure alone suffices for learning is tantamount to blind faith in the most radical form of behaviorism: it attributes to the learner little if any innate organization (disposition to learn certain types of organization rather than others) beyond the ability to respond to reinforcement. (L/J, 1983: p. 301)

I agree with L/J that music cognition is not simply a matter of exposure, but it is notable that they introduce in the above statement a new twist on the notion of "learning," which they have continually defined as an intrinsic part of the listening act alone, and not due to the effects of direct instruction. I contend that L/J's notion of music "learning" is in effect conceived as a form of behaviour, because it is purportedly done at a level inaccessible to the learner and in a form which is entirely due (in terms of the sets of preference rules in has in place at any given time) to the predispositions of the cognizing apparatus. In other words, the process of musical organization is deemed to be mechanical and preset according to the status of the sets of operational rules in place within the cognizing apparatus at any given time.

In point of fact, the co-authors make no mention anywhere in *GTTM* that music cognition involves anything but a mechanical (i.e, behaviouristic) set of procedures. Since the model stipulates the involuntary aspects of organizational structure, I suggest that such a claim is not much different than a claim (on the behaviourist model) that a listener's music cognizing apparatus is predisposed to behave in a given way due to the preset organization of innate cognitive structures. To this end, L/J state that "there is an overwhelming amount of evidence throughout all areas of psychology that human ability to structure the environment is genetically predetermined" (L/J, 1983: p. 301). The limits of this study preclude a discussion of the general cognitive capacities of humans. However, I find L/J's next sentence in *GTTM* contentious in the manner in which they naturalize music as one in an array of cognitive capacities, especially in terms of the main points of criticism in this study. This approach is evident in the co-authors' claim that they "see no reason why musical capacity should be any exception" (L/J, 1983: p. 301). Throughout this study, I will continue to reinforce the important point that although

auditory cognition in the most general sense may in fact be a natural cognitive endowment, music and music cognition are not in any sense "natural" features of the human brain as proposed by L/J.

As demonstrated, L/J use the Western tonal music idiom as a resource to build a theory of structural organization, but the organizational procedures used by the 'generative musical grammar' have been shown to work badly in terms of twentieth-century musical idioms. I have established that said procedures do not work well because of the co-authors' insistence on applying standards previously set for the cognition of tonal music to musical idioms which may not even possess such idiosyncratic features as pitch and rhythm hierarchies. However, since L/J's model depends to a great degree upon certain important respects of the 'linguistic grammar' model, the notion of 'hierarchical organization' seems (by necessity) to be an inherent feature of its design. Following that, since it is the assumed orthodoxy of cognitivist approaches to language that hierarchical organization is a natural feature of the cognitive landscape for language acquisition, L/J feel justified in reapplying that assumption to the 'generative musical grammar.' This chain of logic leads L/J to conclude (albeit incorrectly) that hierarchical organization of all musical idioms is a natural (and necessary) process. This in turn leads L/J to conclude further that the reason listeners have difficulty understanding many forms of twentieth-century music is because they are not naturally endowed to do so. This conclusion is evidenced in the co-authors statement that "all that the argument above implies that listeners will find it difficult to assign any rich structure to music composed by these [aleatoric, probabilistic, serialist] techniques. This conclusion is plausible, and it may account for the relative inaccessibility of this music" (L/J, 1983: p. 301). As indicated earlier, the implied value judgment in terms of the so-called "relative inaccessibility of this music" L/J make reveals more about their musical prejudices than does it illuminate questions of the cognition of twentiethcentury music.

The reality of the situation is that there are many other factors contributing to the socalled "relative inaccessibility" of twentieth-century music than have to do with problems connected with its cognition. Theodor Adorno (1973, 1984) is one author who speaks eloquently of the reification of CPP music and its subsequent commodification. He also comments on the social-commentary aspects of much twentieth-century art. Within the conditions implied by the APV, L/J's theoretical framework for music cognition does not permit consideration of the above factors. However, such factors may have to be seriously taken into consideration in terms of the future development of a comprehensive (i.e., non-APV-centred) theory of music cognition which takes into account ideational, conceptual or critical frameworks of reference for works of musical art.

I do not disagree that some music in the twentieth-century is relatively inaccessible, but I do disagree with L/J's explanations for it. That is because I do not agree with the L/J's premise that there must be a continued distinction (and subsequent cognitive segregation) between compositional intention and listener comprehension and that the latter must preclude the former when one listens to music. I have two reasons for my disagreement. First, I do not agree that music is an internalized (i.e., natural) feature of the cognitive landscape. Perhaps it is more truthful to say that music is first and foremost a social and historical construct. Thus, the comprehension of a given musical idiom may necessarily imply an understanding of the musical practices (and the beliefs about music) of those participating in that idiom.

Second, the twentieth-century avant-garde teaches us that an enriched appreciation of art may be possible when there is a co-operation between the conceptual and perceptual organization of the work (and when I mean work, I include the processes of creation and performance as well as the product itself). It is probable, then, that the tonal music idiom may actually require a similar approach for an equally enriched comprehension. L/J's argument in favour of the "naturalness" of the tonal music idiom (and the seeming unnaturalness of twentieth-century musical idioms) may in effect have more to do with the effects of social and cultural factors than being simply a natural feature of the perception/cognition network.

Chapter 7

The Temporal Cognitive Processes Model

7.1 Introduction

The 'temporal cognitive processes' model seeks to test the hypothesis that there exists in humans a generic cognitive music processing capability which encompasses all musical styles. Serafine's (1988) book, *Music as Cognition: The Development of Thought in Sound* advances the thesis that music does not reside in the external world of sounds, scores, or even in the sensations of sounds, but rather in the internal world of cognitive constructs, a mental world of thoughts concerning musical sounds and their relationships. On that basis, Serafine's theory of music cognition adheres to the aforementioned 'hard' construction paradigm.¹ Serafine defines music cognitively as a form of thought, the product of which is the realization of what she calls 'temporal' and 'nontemporal' tonal-rhythmic organization and comprehension.

According to the 'temporal cognitive processes' model, that which occurs at the sensory/perceptual level is only indirectly connected with musical cognitive processes. On that basis, Serafine states that music is a "subjective entity springing from mental operations" (Serafine, 1988: p. 233). The sensory/perception domain is deemed to be strictly 'non-cognitive' and the cognitive domain is in turn strictly 'non-perceptual.' Serafine reverses the old argument, that what is perceived determines thought, by claiming that cognition determines perception. However, as distant as Serafine's argument may seem from Helmholtz's, they concur in the autonomous point of view of music as an insular, hermetic affair. However, for Serafine, music cognition is the organizing process that defines what the listener "hears."² Thus, and at this point in our investigation of various models of CTM, the gradual shift of perspective over the past century and a half is complete with this recent model, from thinking of music in Helmholtzian terms of aural sensation to thinking of music as pure cognition.

^{1.} See Fiske, 1992.

^{2.} I shall comment at length on this crucial point in Section 7.4

7.2 Pretheoretical facts and premises

Serafine lists four facts (or axioms) about music as a starting point for the thesis of "music as cognition." The facts are said to come to us in the form of commonly shared cognitive attributes which have to do with all musical idioms and all participants in music. I shall first list them and then flesh them out separately.

Fact #1, *Universality*: "All cultures possess music and all persons have knowledge of it to a considerable degree" (Serafine, 1988: p. 1).

Fact #2, *Diversity*: "There are many and vastly different types of music, even within a single culture" (Serafine, 1988: p. 1).

Fact #3, Change: "Music changes over time" (Serafine, 1988: p. 1).

Fact #4, *Acquisition*: "The young of a culture come eventually to adopt the general tastes of their parents" (Serafine, 1988: p. 1).

In terms of the notion, 'universality,' Serafine explains that even on an intuitive level, all members of a culture have understandings concerning making differentiations between 'musical' and 'non-musical' sounds as well as being able to differentiate and exhibit preferences between and among styles within a culture, such as jazz, folk, classical, rock, etc. Serafine states that all members of a given musical culture have the untutored capacity to identify familiar melodies and distinguish global surface features of music such as "mood, loudness, meter or beat, tempo, timbre, rhythmic character, and relative number of instruments" (Serafine, 1988: p. 2). Serafine claims that such listeners are reputed to be able to hear when a melody is about to end, they can recognize repeated melodies, and they can tell when a melody inherently, as she states, "makes sense" or "sounds good" (Serafine, 1988: p. 2). Serafine contends that it is the presumed task of a theory of music cognition to explain how all these skills are possessed not just by trained musicians, but by all members of a culture.

In terms of the notion, 'diversity,' Serafine explains that many styles of music can exist within a given culture, and it is the task of a theory of music cognition to explain the coexistence of such diversity within any given culture.

In terms of the notion, 'change,' Serafine explains that musical styles continuously change and that composers even change styles within their own lifetimes. She states that "the facts of style diversity and style change have been the major stumbling blocks for psychological theories of music because...it has been difficult to conceptualize psychological processes that apply beyond the tonal, European style written between 1650 and 1900 [i.e., the CPP]" (Serafine, 1988: p. 5).³ Serafine claims that music cognition theory must effectively account for such change.

In terms of the notion, 'acquisition,' Serafine claims that a youngster *instinctively* knows about (without being told about) "order in music, what features of it should be attended to, what makes melodies similar and different, and properly makes a tune, and so forth" (Serafine, 1988: p. 5). Thus, a proper theory of music cognition must explain the processes involved in the acquisition of these skills from childhood to adulthood. Having set out the above facts, I shall now set out the five pre-theoretical claims (or premises) that Serafine establishes for the conceptual framework for the 'temporal cognitive processes' model.

Premise #1: Serafine states that "the principal transaction in a musical enterprise is assumed to be that between a person—composer, performer, or listener—and a piece of music" (Serafine, 1988: p. 6). This is unlike the serial chain of communication from composer to performer to listener assumed in H/C's model. Serafine identifies the critical line of interaction as being between the music and any and each of the above participants but not between or among participants themselves.⁴

Premise #2: Serafine states that "music arises from a core set of cognitive processes common to all three activities, composing, performing, and listening" (Serafine, 1988: p. 6). Cognitive processes involving all three activities are said to overlap to some degree for music to

^{3.} As indicated earlier, one of the major stumbling blocks of CTM is that there is an overabundant use of material from the CPP. My argument is that rather than serving the admirable task of simply illustrating theoretical points, Serafine's exclusive (and overabundant) use of CPP musical examples risks an unwitting setting of implicit paradigms for theorizing about cognitive universals. This is so because the types of patterns and forms inherent in CPP music itself, becoming implicitly paradigmatic, come to influence theoretical assumptions about *all* music.

^{4.} This point follows the APV-based paradigm of a cognizing subject interacting with a musical object. See my comments concerning this issue in Chapter 10.

exist at all. Thus, there can be no privileged access to cognitive processes pertinent to either composing, performing or listening. This leads Serafine to propose two corollaries, quoted below:

(Corollary #1): The patterns, relationships, and organizations that we claim to see "in the music" must also be apprehended by listeners, or they do not count as evidence of "real" music cognitions. (Serafine, 1988: p. 7) (Corollary #2): The processes that we claim to have discovered "in the head" (chiefly through perception experiments) must also be evidenced in how music actually *is*, now and in other eras. (Serafine, 1988: p. 7)⁵

Premise #3: Serafine states that "two types of cognitive processes occur in music...*style-specific* and *generic* processes" (Serafine, 1988: p. 6, Serafine's italics). According to Serafine, cognitive processes leading to the sense of completion in a dominant-tonic cadence are style-specific in terms of the Western tonal musical idiom, but the general (panstylistic) notion of closure or completion is considered to be a generic process.

Premise #4: Serafine states that "cognition in music—in listening as well as in composing and performing—is an active, constructive process" (Serafine, 1988: p. 7). Serafine adheres to a 'strong' cognitivist position, which questions the veridity of the existence of musical properties in pieces of music prior to their being cognitively constructed.⁶

Premise #5: Serafine states that "tones and chords cannot in any meaningful and especially psychological way be considered the [constituent] elements of music. Rather, tones and chords are viewed as the inevitable by-product of musical writing and analysis, and as

^{5.} As I will explain more fully shortly, so-called 'real' cognitions, are stipulated as arriving solely by means of the auditory processes. Staying true to the APV, Serafine relegates all cognitions resulting from non-auditory processes or conceptualizations as 'non-musical.'

^{6.} This claim is early evidence that Serafine adheres to the scientific supervenience thesis.

such are useful, even necessary analytic tools with minimal cognitive reality" (Serafine, 1988: p. 7).⁷

I shall now summarize Serafine's ideas up to this point. The theoretical premises can be boiled down to the following three: 1) Acoustic entities (e.g., tones, chords) have as Serafine states, "minimal cognitive reality" (Serafine, 1988: p. 7). According to Serafine, the *real* reality of music is in cognitively realized tonal-rhythmic relationships and pattern organization. 2) All 'musical' activity (composing, performing, listening) is the result of the same set of cognitive operations. 3) There are two types of cognitive processes: generic (universal), and style-specific.

The above premises lead to the following three hypothesis levels: 1) A set of generic, universal (panstylistic) processes. 2) 1) is a specifiable set. 3) Each of 1) is acquired through the genetically controlled development of internal cognitive operations.

In short, Serafine's theory is concerned (similar to L/J's) with describing a set of generic cognitive processes that lead to or form the basis for style-specific processes. In the next section, I shall outline and explain the terms and features of the 'temporal cognitive processes' model.

7.3 Description of the model

Remaining true to the orthodoxy of CTM, Serafine defines music as "the activity of *thinking* in or with sound...[and] musical thought may be defined as human aural-cognitive activity that results in the posing of artworks embodying finite and organized sets of temporal events described in sound" (Serafine, 1988: p. 69, Serafine's italics). According to this definition, the defining characteristic of music is not 'sound' but rather 'temporality'. Serafine stipulates that

^{7.} There has been considerable and lively commentary in reaction to this somewhat inflammatory point. In my view, it is an ontological issue which I shall discuss later in the chapter. Briefly, it is more evidence of an adherence to the scientific supervenience mode.

the emphasis is on organization in an ongoing, temporal context, rather than on the perception of the physical entities of sounds (or silences) per se. The *temporality of music is its defining feature*, and the role of specific pitch, duration, loudness, and timbral characteristics of sound events is of only secondary importance. Sound is the medium through which interesting temporal events are organized, but however necessary sound is as the carrier of music, it is by itself an insufficient definition of the artform. The principal characteristic of music is movement in time—the exploration of simultaneous and successive events that embody points of arrival and stasis, points of departure and continuation, and a train of even-to-event similarities and transformations" (Serafine, 1988: p. 69, my italics).⁸

The 'temporal cognitive processes' model is subdivided into two levels of operation: that is, 'temporal' processes and 'nontemporal' processes. Serafine states that the 'temporal' processes "result from immediate, note-to-note, phrase-to-phrase reality...[and] are tied to surface level, event-to-event groupings" (Serafine, 1988: pp. 79-80). 'Nontemporal' processes are at a deeper cognitive level. Serafine states that they "are more formal, logical, abstract operations performed on musical material...[even though they are still] temporal in the sense that all music is temporal—that is, it unfolds in time" (Serafine, 1988: p. 79). The 'nontemporal' processes subsume four operations: 'closure,' 'transformation,' 'abstraction,' and 'hierarchic levels.'9

7.3.1 Temporal processes

According to Serafine, temporal processes subsume conditions of what she calls 'succession' and 'simultaneity.' Intuitively, these terms refer to things happening one after the other or at the same time. In terms 'succession,' Serafine states that "the successive dimension

^{8.} The italicized passages will serve to provide the reader with a focus for my critical commentary in Section 7.4.

^{9.} I am not sure if the labels 'temporal' and 'nontemporal' do more to confuse than clarify the issues at hand. Since all musical processes are ultimately tied to temporality (because music itself is ontologically temporal), it is difficult to see how a process such as closure can be nontemporal, since the notion of closure implies an action of closing, cutting off, or ending. Such actions seem intuitively to be inherently temporal. A less confusing appellation might be to refer to temporal processes as 'surface-level' or 'real-time' processes and to nontemporal processes as 'deep-level' or 'formal' processes. It seems to me that Serafine has specific reasons for reversing the 'sound-in-time' equation to a 'time-in-sound' idea in order to explain *all* musical cognitive processes in terms of temporality. I shall attempt to tease out those reasons in Section 7.4.

unfolds in time, beginning with shorter units that extend to create new, longer units" (Serafine, 1998: p. 74). In the model, there are four sub-processes of 'succession.'¹⁰ These are outlined below:

Processes of succession

1) *Idiomatic construction* depends upon the listener's conceiving of basic building blocks or cohesive units. Serafine states that these may include "melodic fragments or motives, longer melodies, rhythmic patterns, harmonic or timbral sequences, or any coherent 'block' or area of sound that acts as a cohesive unit" (Serafine, 1988: pp. 74-75). In clarifying the term, 'coherence,' Serafine states that "a unit's coherence depends critically on its abiding by the organizational rules of some idiom" (Serafine, 1988: p. 75). Serafine goes on to say that separate tones or pitches (as discrete and isolable sound events) "are perceived or felt as a continuous gesture. The separate tones of a melody are perceived in a continuous sweep so that earlier tones are somewhat tied to later ones, even after the former have quit sounding" (Serafine, 1988: p. 75).

2) *Motivic chaining* is defined as the "cumulative or additive process by which any two or more units (or motives) are combined successively into a longer one" (Serafine, 1988: p. 75). The building-up process into a larger whole is said to be known by the listener only retrospectively. Serafine explains that "there is a building up of the whole successively, as an extension or unfolding, of which one becomes aware only in hindsight...[and] the whole is known only in the experience of temporal succession" (Serafine, 1988: p. 76).

3) Pattern detection is defined as a chaining of motives or units in a repetitive sequence. Patterns may repeat, alternate, or may modulate to form sequences. Serafine states that "patterns give rise to two forms of expectation: continuation (of the pattern or sequence at hand) and cessation (since ultimately all patterns cease)...the general process of chaining one or more units repetitively so that perceived patterns result, appears to be a near-universal process

^{10.} As indicated earlier, Serafine's typology of musical cognitive processes seems to hang on the reversal of the time-honoured tradition of conceiving music as sound carried in a framework (or vehicle) of temporality. Serafine's claim for the primacy of temporality over the sonic dimension (that temporal events are carried in a sonic vehicle) creates serious epistemic and ontological problems for the internal validity of her model. I shall reserve more detailed comment on this issue in Section 7.4.

in understanding music" (Serafine, 1988: p. 76).

4) *Phrasing detection* is defined as the process of grouping "musical events into clusters, 'chunks,' or phrases, which may or may not be equal in length" (Serafine, 1988: p. 76). Phrases have boundaries, which Serafine states are delineated by "text [in song], pauses for breath, or any change in timbre, register, or ... performer" (Serafine, 1988: p. 76).

Processes of simultaneity

Serafine stipulates that the dimension of simultaneity in music requires "the operation of combining and synthesizing musical events, vertically adding or superimposing one event on another" (Serafine, 1988: p. 77).¹¹ As Serafine claims, the central issue concerning 'simultaneity' is for the cognizer to decide whether two or more events occurring simultaneously retain discreteness or whether they combine to form a single new event.

1) *Tonal synthesis*¹² occurs when two or more tones sound simultaneously. A chord is an example of 'tonal synthesis.' Serafine refers specifically to a standard major or minor triad as a typical case of 'tonal synthesis' in which three tones (as discrete events) combine nicely to form a new whole, resulting in a submersion or total elimination of the sense of the discreteness of each of the three tones.

2) *Timbral synthesis* is defined as the "combining of two or more timbres (e.g., instrumental tone colours) with the result that such syntheses may range from tight, unified blends to separable, distinct juxtapositions" (Serafine, 1988: p. 77). Serafine (1981) claims that younger children have more difficulty in imagining or predicting combinations of timbres. Her experimentation has lead her to the empirical conclusion that such an operation is a more sophisticated cognitive process which is attributable to later cognitive development.

^{11.} See my comments on 'verticality' and 'horizontality' in my critical remarks in Section 7.4.

^{12.} Serafine does not provide a specific label for this process (although she does describe the process itself). I hope she will not object to my contribution to her typology.

3) *Motivic synthesis* is defined as "the compounding of any two or more motives or units, such as multiple melodies or rhythmic patterns" (Serafine, 1988: p. 78). The central issue concerns whether two motives occurring simultaneously retain discreteness or whether they combine to produce a new whole.¹³

4) Textural abstraction¹⁴ is defined as that which "involves the organization of simultaneous areas or streams of activity. That is, the collage of simultaneous sounds that can be identified as the composition must be divided (vertically) and organized so that a definable *texture* emerges. Described-most-generally, textural organization involves the putting together of what-goes-on-with-what and the separation of the 'whats' into various components that contrast and interact" (Serafine, 1988: p. 78). 'Textural abstraction' is differentiated from 'timbral synthesis' in the sense that the events do not occur with the strict parallelism required for 'timbral synthesis.' Serafine states that examples of 'textural abstraction' consist of "figure-versus-ground, or melody-against-accompaniment textures or, say, polyphonic textures (such as counterpoint or fugue) in which two or more simultaneous parts are of equal importance" (Serafine, 1988: p. 78).

7.3.2 Nontemporal processes

As earlier described, the so-called 'nontemporal' processes are instantiated at a deeper cognitive level and deal with formal, logical and abstract operations.¹⁵ The 'nontemporal'

^{13.} I contend that Serafine's interpreting of the above as an issue in the first place is greatly dependent upon her 'time-in-sound' ontological framework. In the traditional 'sound-in-time' ontological framework, the discreteness of simultaneously occurring motives might not be affected. See more detailed discussion on this issue in Section 7.4.

^{14.} Serafine calls this process 'textual abstraction.' I take her to mean abstraction of *texture* rather than abstraction of *text*. I hope Professor Serafine will forgive me for relabelling the process.

^{15.} As stated earlier in a footnote, the labels 'temporal' and 'nontemporal' are unfortunately confusing, because ontologically, all music is temporal. I have also suggested that more appropriate appellations for 'temporal' and 'nontemporal' might be 'surface-level' or 'real-time' and 'deep-level' or 'formal' processes respectively.

processes subsume four operations: 'closure,' 'transformation,' 'abstraction,' and 'hierarchic levels' (also referred to variously as 'hierarchic structuring').

1) *Closure* is defined as "points of stasis and stability which imply cessation. It is movement which propels us forward in time and closure which brings us to rest, to the end of a section or piece" (Serafine, 1988: p. 80).¹⁶

2) Transformation is defined as being responsible for many

unity-generating effects in music, for it results in the awareness of similarity in the face of ostensible differences...[and is] the more general source or cause for similarity/difference relationships, for the nature and degree of similarity and difference between two musical events can be logically described by the steps that would be entailed to transform one event into the other. That is, similarity/difference relationships are themselves relative, psychological judgments; and transformation is the more general process or operation that effects or results in similarity and difference. (Serafine, 1988: pp. 80-81)

There is a hint that 'transformation' belongs to a deeper (and possibly cognitively

inaccessible) level of mental operation. Serafine states that "transformations...may or may not be accessible to a conscious awareness, but the logical transformations in question must result in the experience of aural cohesion" (Serafine, 1988: p. 81). Thus we can assume that 'transformations' (and by implication, 'nontemporal' processes) have causal properties. Serafine states that the "*heard* similarity and thus *heard* unity [describe] the relationships of transformation that obtain between two musical events or structures" (Serafine, 1988: p. 81, my italics). According to Serafine, the idea of "hearing" constitutes that which is cognized: that is, a listener is said to "hear" features such as similarity and unity as a post-cognitive effect or result.¹⁷

^{16.} Serafine cites the tonic chord as a paradigm example from Western music of 'closure.' However, it would seem (judging from the above definition) that there might be more to the notion of 'closure' than the tonic chord. Perhaps it ought to include the dominant chord in conjunction with the tonic, as implied in the closure-like motion in a perfect cadence. See Section 7.4 for more detailed commentary.

^{17.} Serafine's vagueness in terms of explaining the notion, 'cognitive accessibility' is troubling. Unfortunately, her failure to elaborate further on this important issue in cognitive theory does not give the reader a very good picture of her stand on the question. For an extended commentary on this and other issues concerning 'transformation,' see Section 7.4.

Serafine distinguishes three types of transformative operations: first, *relative repetition*; second, ornamentation; and third, substantive transformation. The author defines 'relative repetition' as having two types: "(a) identity or exact repetition (with only temporal displacement) and (b) repetition with figurative changes such as transposition of key or register, changes of mode, tempo, accompaniment, or dynamics" (Serafine, 1988: p. 81). Examples of 'relative repetition' are said to occur often in CPP music, in jazz and in certain folk music idioms. Serafine states that 'ornamentation' "involves the alteration of a musical event through the addition, overlay, or superimposition of other events, usually with a result that is substantially more changed than with relative repetition" (Serafine, 1988: p. 82). Examples of 'ornamentation' include trills, turns, and slight melodic alterations. Jazz and American fiddle music, as well as European CPP music, are idioms that make substantial use of 'ornamentation.' Serafine states that while both 'relative repetition' and 'ornamentation' maintain the integrity of the original event, 'substantive transformation' may not. Serafine states that the alterations of an original event "are more abstract" (Serafine, 1988: p. 82), and extend to such operations as the alteration of contour while maintaining key, changing of the rhythm, and/or being subjected to retrograde, inversion and retrograde inversion treatments.

Serafine suggests that the list of possible ways to transform a passage in a piece of music is as long as the list of compositional techniques itself. However, she warns that "one of the continuing problems is the identification of which transformations are, in fact, perceived as such by listeners, and which may be considered only formal, logical transformations that are perceived by listeners as new, unrelated material" (Serafine, 1988: p. 83). She states that the empirical evidence (at point of writing) was not optimistic in terms of finding listeners who could detect such 'transformations' as inversion, retrograde, retrograde inversion.¹⁸

3) Abstraction is defined as "the process by which some aspect of a musical event is removed or considered apart from its original context and is relocated elsewhere in the composition. Some relationship or connection between the original appearance and later

^{18.} See my comments on this point in Section 7.4.

appearance is thus implied" (Serafine, 1988: p. 83). Serafine distinguishes two types of 'abstraction:' first, 'motivic abstraction' and second, 'property abstraction.' Serafine states that 'motivic abstraction' "occurs when a subunit or fragment of a theme is removed and reused in a new theme" (Serafine, 1988: p. 83). She cites the musical opus of Beethoven as a good resource in which to find examples of 'motivic abstraction.' Serafine states that 'property abstraction' "occurs when some general property—only the rhythmic pattern, tonal pattern, or harmonic progression, for example—is abstracted form one section and reappears in another" (Serafine, 1988: pp. 83-84). 'Rhythmic abstraction' is often found in the jazz idiom. Serafine has found examples of 'rhythmic abstraction' in Comanche Indian Peyote Song in which the same rhythmic is re-employed in different melodies. (see Nettl 1956a)

Serafine states that 'abstraction' is central to creating a sense of unity in musical compositions. She says this is so because it "represents the parsimonious use and reuse of the same or similar material over long spans of time" (Serafine, 1988: p. 84).¹⁹ According to the stipulations of the model, 'abstraction' is often a prerequisite for 'transformation' processes. Serafine states that this is so because a given passage has to be "abstracted from its original context and compared to or connected with its later, transformed version" (Serafine, 1988: p. 84). It is interesting that in 'abstraction,' not only just some part of the whole, but even, as Serafine says, "some *property* of the whole" (Serafine, 1988: p. 84, my italics), can be removed and reused later in a transformed version. Serafine suggests that, as far as contemporary empirical evidence tells us, there is a problem with 'abstraction' in that there is no conclusive way of telling whether a listener is really abstracting material or is perceiving subsequent 'transformations' as new material. She says that 'abstraction' is easier to detect in simple

^{19.} Described in this way, it is not clear whether Serafine is describing a compositional technique (manifestly described) or a feature of cognition (scientifically described). I shall elaborate on this in my critical commentary later in the chapter.

examples, but that more complex musical examples do not reveal clear and conclusive detection

of 'abstraction.'20

4) For the notion of *hierarchic levels*, Serafine owes particular allegiance to Heinrich

Schenker (1935/1979). In fact, Serafine's definition of 'hierarchic structuring' sounds strongly

Schenkerian when she states that

a musical composition embodies an underlying structure composed of its most important or focal tones, and other, less important tones hav[ing] the role of circumscribing and elaborating these focal ones...some tones have greater importance or primacy in terms of organizational structure, and together these constitute what may be called the *structure* of a piece...the cognitive process of hierarchic structuring involves the imposing of a more simplified, reduced structure, on the vast array of sounds in the piece. (Serafine, 1988: p. 85, Serafine's italics)²¹

Serafine elaborates upon the concept of 'hierarchic structuring' by alluding to such

specific Schenkerian reductive processes resulting in 'background,' 'middleground' and

'foreground' compound melody. In drawing upon an example from Bach (the Prelude from the

English Suite No. 2), Serafine stipulates that the reduction offered

stands as a formal representation of how a piece *may* be hierarchically structured. Suffice it to say that, while there is debate about the precise nature of such structures in music (theorists differ in their renditions of structures, for example) it seems clear that listeners employ some principles of organization in which a vast array of sound is construed in terms of central, focal tones or events. (Serafine, 1988: p. 88)²²

22. See my comments concerning this issue in Section 7.4.

^{20.} See my comments concerning this issue in Section 7.4.

^{21.} In addition to Schenker, Serafine credits (for the notion of hierarchic levels) theorists such as Forte (1935) for his work in tonal music theory, Berry (1980) for his work on the identification of structural levels, Strunk (1979) for his analysis of early jazz pieces, and Nettl (1973) for his studies of American folk and traditional music, all of which examine musical idioms exhibiting various degrees of 'hierarchical structuring.'

7.3.3 The place for a developmental approach

One important and distinguishing feature of Serafine's theoretical model (setting it apart from the other models examined in this study) is that it attempts to explain music cognition in terms of developmental psychology. Serafine points out that one of the classic questions in developmental psychology is the problem of differentiating the causes and roles of the *qualitative* and *quantitative* changes (i.e., differences) in human cognition that occur in the progression from childhood to adulthood. Serafine states that the idea of 'qualitative difference' implies that the child's mind is "fundamentally different" from the adult mind in how it works, whereas 'quantitative difference' implies that the child's and the adult's mind are "essentially alike" except for the relative accumulation of experience (See Serafine, 1988: p. 89).

Thus, the question is whether experience (perhaps in the form of training) helps children to acquire otherwise naturally acquired concepts sooner. Serafine states that "perhaps the wisest conclusion is that training is generally *not* effective for very young nonconservers, although it may be effective for older children who are nearer the age when they would acquire [concepts such as] conservation on their own. Training, then, helps these children achieve the concept sooner" (Serafine, 1988: p. 90). Thus, according to Serafine, the aim of developmental psychology, being epistemologically centred, is to determine the source of knowledge as cognitively inherent or environmentally acquired or some combination of both.

In terms of perception, Serafine notes that the perceptual apparatus of the child at a certain early point is fully functioning (and in some cases, colour perception and certain speech discrimination abilities even exceed adult capacities). It is concerning this point that Serafine rationalizes her postulation that music is not a really matter of perception, but rather of cognition. She states that

to the degree that music is a matter of *perceiving the features of external stimuli*, then children should have the perceptions of music that are similar to those of adults...on the other hand, to the degree that music is a matter of internal cognitive operations, then we would expect wide differences between children and adults and even between younger and older children. (Serafine, 1988: p. 91) The results of Serafine's experiments (outlined in Chapters 4 and 5 of the 1988 book) reveal significant differences between children and adults in terms of the generic cognitive processes previously described in this chapter. She notes that the musical training of some of the subjects did not significantly raise their test results. In promoting the primacy of cognition over perception, Serafine states that "the issue [among theories of music cognition] is whether music involves something more like color perception (i.e., stimulus feature perception) or more like conservation (i.e., subjective cognitive activity). The more general question, as I have put it previously, concerns where music resides" (Serafine, 1988: p. 92).²³

Serafine's argument is against theories which postulate a two-step perception/cognition process. She states that such a view is unsupportable because

there is little to presume a two-step process in which the initial perception is of sufficient consequence beyond the fact that nearly all human activities involve feature perception. For we do not consider color perception or shape perception to be a central process in chess, for example, or number or symbol detection to be a central process in mathematics...ordinary perception is a necessary companion to the understanding of music, but the study of it is no window on how musical understanding occurs. (Serafine, 1988: p. 92)²⁴

This completes my presentation of Serafine's theoretical model. For the remainder of the chapter, I shall deal with the somewhat contentious issues which have arisen in the above expository passages.

^{23.} In my view, the question, if posed in this manner, misses the point. It is a debatable whether perception and cognition are as discrete as Serafine suggests. I shall have more to say on that later in the chapter.

^{24.} See my comments concerning this issue in Section 7.4.

7.4 Critical Commentary

7.4.1 Epistemological and ontological issues

7.4.1a Questions of sound and time in music

Serafine states that temporality is the defining (i.e., primary) feature of music. In my view, this is a mistake of identity. Nevertheless, the primacy of temporality motivates the conceptual framework of Serafine's theory. We have here an ontological question which sets the traditional 'sound-in-a-framework-of-time' paradigm against Serafine's proposal for a 'temporal-events-described-in-sound' paradigm. That is, it sets the traditional notion that sound (including silence as a component of sound) is the primary feature of music, carried in a framework of time, against Serafine's alternative proposal that time is the primary feature of music, carried in a framework of sound. Serafine states that "sound is by itself an insufficient definition of the artform. The principal characteristic of music is movement in time—the exploration of simultaneous and successive events that embody points of arrival and stasis, points of departure and continuation, and a train of event-to-event similarities and transform-ations" (Serafine, p. 69).²⁵

Without entering into a discussion concerning the necessary and sufficient features of music, let us say for now that there are severe problems imbedded in placing temporality before sound in terms of *any* definition of music, no matter how reductive. In his review of the 1988 book, William Thomson (1990) states that "this misconception of time as the original sensory stuffing permeates Professor Serafine's book...and the problem is that [her definition of music] is a better definition of dance [as 'movement in time']" (Thomson, 1990: pp. 25-26). I agree with Thomson, who goes on to say that "temporality is the obligatory bed of all human consciousness. Alleging that it is the primary medium of music puts the ubiquitous cart before the motivating horse. Saying that time, not sound, is the primary ingredient of music once again posits what appears to be a profundity where only a mistaken identity exists" (Thomson, 1990:

^{25.} There are more problems created than solved by venturing into such reductive attempts to define music. I shall explore Serafine's motives shortly.

p. 25). Nevertheless, Serafine's ontological point of view forms the foundation for her 'temporal cognitive processes' model. However, Serafine's adopted view does not come without a price because it creates an atmosphere of confusion for her theoretical model. I shall bring these confusing points to light later in the chapter.

In bringing Thomson's criticism to a finer point, I interpret Serafine's claims as effectively making a claim for what I shall call a form of musical 'temporal perception.'²⁶ Although Serafine refers to music throughout the book as being instantiated in the aural-cognitive domain, it might be more accurate to say that she actually claims music to be organized in a sort of 'temporalcognitive' domain. This is the conceptual framework in which I understand Serafine to be referring to when she claims that "musical thought may be defined as the aural-cognitive activity that results in the posing of artworks embodying finite and organized sets of temporal events described in sound" (Serafine, 1988: p. 69). It is difficult to surmise whether Serafine means that temporal events are instantiated phenomenally (i.e., in terms of the manifest image) or cognitively (i.e., in terms of the scientific image). If she means the former, then the question arises whether temporal events are in the perceptual domain, and if she means the latter, in the cognitive domain. Nevertheless, the situation persists that Serafine's model unfolds as a description of how the cognizing apparatus organizes temporally-perceived *sonic* events. This fact comes to light when Serafine states that the cognizing apparatus organizes sonic events as temporal events. To this end, she states that "the emphasis is on organization in an ongoing temporal context, rather than on the perception of the physical entities of sounds (or silences) per se" (Serafine, p. 69).

I have two reasons for claiming that Serafine is making a mistake of identity in her apparent postulation of a mode of 'temporal perception.' If, according to Serafine, music actually involves the perception of so-called 'temporal entities' (and not sonic entities), then the reader will need to know how Serafine defines a 'temporal entity.' At first glance, it would seem

^{26.} Serafine does not actually use the term, but if the reader will bear with me, my use of the term will be clarified shortly.

self-evident that all sonic events are inherently temporal and therefore are, in some intuitive way, 'temporal entities.' That being the case, it would then seem that Serafine is left with a tautology and hence no theory. Secondly, since I do not think (and I do not think Serafine believes) that humans possess a time-perceiving sensory organ, it would seem that Serafine's model is based on a premise (stated in terms of the perception and cognition of 'temporal entities') which seems to be an apparent ontological impossibility. Given the unorthodox character of Serafine's claim for the primacy of temporality in music, it warrants an attempt to understand what motivates the claim. I identify two motives.

First, it seems that one of Serafine's goals is to eliminate (or at the very least, to deprioritize) the sensation/perception domain as a working component of a conceptual framework for music cognition theory. In doing so, she succeeds in relegating the sensation/perception domain to a functional role of transporting auditory data at best, and as a consequence relinquishes it of its paradigmatically recognized essential role in music cognition. Thus, with sensation/perception out of the conceptual picture, music can then be identified as a purely cognitive phenomenon.

I suggest that Serafine's second motive for adopting a "temporal-events-described-insound" ontology is to fortify her so-called 'strong' cognitivist position. Recall that Serafine defines music using the criteria of the APV, stating that her definition "emphasizes auralcognitive activity—that is, thought having to do with sound—and it excludes all such thinking that does *not* involve sound" (Serafine, 1988: p. 70, Serafine's italics).²⁷ Maintaining an APVbased stance, Serafine excludes from "musical" thinking such items as

nonaural clues as verbal pitch names, visualizations of music notation, or images of colors, spaces, or objects...items that may be *about* music but not *in* music... [such as] verbal description ('The music sounds jagged')...; conscious awareness of the compositional or performance techniques of the piece; speculations about historical or biographical matters; verbal labelings of the progress of musical events...[or] when words occur in the artwork itself, their consideration is

^{27.} It would seem more consistent with what Serafine has said previously for her to speak now in terms of thinking with "temporal events described in sound" rather than with sound alone. This is an ongoing source of confusion, since she clearly states that she prioritizes temporal events over sonic events.

excluded from the definition of music if it is their semantic meaning that is the focus of attentions. (Serafine, 1988: p. 70)

In adhering to the stipulations provided by the APV, Serafine draws a clear border in the above statement between so-called 'musical' and 'nonmusical' categories. That is, things 'musical' are restricted to the aural-cognitive domain, whereas things 'nonmusical' exist outside said domain. Thus, music cognition is then defined as an activity comprising the temporal (and nontemporal) organization of so-called 'musical' sounds as established in terms of the APV. Viewed this way, the march toward the complete formalization of music cognition is now at hand. As Serafine explains, the 'temporal' processes (i.e., simultaneity and succession) reduce sonic input to cognitive resultants within the real-time domain to cognitions of temporal entities, and the 'nontemporal' processes (i.e., closure, transformation, abstraction and hierarchic structuring) reduce sonic input to cognitive resultants within the abstract (i.e., symbolic) domain.²⁸

7.4.1b Defining music under the APV

Serafine makes a fifth and final stipulation for her definition of music. She claims that "the definition of music calls for the activity of posing an artwork" (Serafine, 1988: p. 71). She states that such activities as composing, performing and listening are all "rooted in a common set of basic musical-cognitive processes" (Serafine, 1988: p. 71). The problem with this claim is that not all musical activity is or need be concerned with "posing an artwork." This assumption, however, is certainly a logical outcome of an APV-based conceptual framework. Serafine further states that "the term composing refers to all deliberate acts of combining sounds within a specified time frame for the purposes of creating interesting temporal events" (Serafine, 1988: p. 71). That may be true as far as it goes, but I do not think it necessarily implies that the result of composing is always or necessarily the creation of an artwork. One person's music is just as

^{28.} In Section 7.4.1d, I shall elaborate on the motivations for Serafine's theory, pointedly in terms of what I shall call the "de-formalization" of the hitherto formal elements of music.

much someone else's noise, so to affix the term "artwork" to a piece of music is entering into a realm which favours normalizing musical activity under the rubric of the APV.

As I have stated, the above-stated stipulation is revealing in its heavy bias towards the APV, which we know has its own roots in the condition that the experience of music (or visual art, poetry, etc.) necessitates a cognitive and perceptually oriented reflection and appreciation of works as 'fine art.' In terms of musical artworks, Serafine's APV-based bias is especially revealed by her stipulation that whether or not a composer employs organizational devices (e.g., serial order, fixed tonality, mathematical formulations, names, etc.), the only truly 'musical' thinking is that which is done with sounds. To this end, Serafine states that "composing may or may not involve the fixing of an aural organization of events (as through visual notation or electronic recording), but it always involves sound events that are to some degree intentional and planned" (Serafine, 1988: p. 71, my italics). This statement gets Serafine into a bit of difficulty because of the ontological confusion she creates by reversing her former claim that temporal events have primacy over sonic events. Then (returning to the original point), Serafine claims (in terms of the APV) that musical thought does *not* involve nonaurally motivated acts of composition, such as "arbitrary selection of key, instrument, or tone row" (Serafine, 1988: p. 72), such as the spelling out of pitchnames from nonaural sources, symbols, representational devices, worked out themes (e.g., a canonic theme that works backward or forward...), historical connections, verbal or visual imagery, emotional reflections, or thematic connections with instruments or characters. (See Serafine, 1988: p. 72)

Below is a summary of Serafine's description of the steps taken during the course of a musical thought: 1) temporal space is defined; 2) acoustic space is defined; 3) "large areas of time are divided and subdivided; small units are created, then chained together" (Serafine, 1988: p. 72); 4) transformation occurs when "memorable collections of sounds, perhaps patterns, undergo change" (Serafine, 1988: p. 72); 5) hierarchies are formed when sounds subdivide into elaborations and fundamental structures; 6) closure and movement occurs when vertical formulations create areas of stability and repose; 7) intensity levels change; and 8)

"change, repetition and silence imply and forecast events which may or may not actualize" (Serafine, 1988: p. 73).

All the steps listed above point to the formal processes postulated in the cognition of music. However, none of the above assists in explaining Serafine's stipulation that music cognition necessitates the aforementioned "posing of artworks." I contend that Serafine fails to bridge the gap between the organizational processes (scientifically conceived) and the creation of works of musical art (manifestly conceived). This is yet another instance of what Thomson refers to as the "In Here, Out There" problem. In other words, Serafine's approach to CTM is a paradigmatic instance of how scientific-image explanations of music fail to bridge the gap to the level of manifest-image explanations of music. Serafine's answer is that since there *are* no external manifestations of music, and that since music is presumed to be ontologically internal, there is nothing to discuss in terms of the manifest image. Unfortunately, Serafine's explanation is lacking the substance needed to satisfy an intuitive explanation that accounts for both the manifest and the scientific images of music.

7.4.1c The constituent elements of music

In this section, I shall demonstrate how Serafine "deformalizes" (or "referentializes") the APV. To begin, Serafine makes what appears at first glance to be some rather provocative statements in her claim that

the tones and chords cannot in any meaningful and especially psychological way be considered the elements of music. Rather, tones and chords are viewed as the inevitable by-product of musical writing and analysis, and as such are useful, even necessary analytic tools with minimal cognitive reality. (Serafine, 1988: p. 7)

In addition, Serafine claims that although such elements as discrete pitches are fundamental to the composition, performance and analysis of western music,

this does not imply, however, that they are the fundamental, natural units of cognitive processing, or that the twelve discrete pitches preexist. Rather, like scales and chords, discrete pitches are the artifacts of reflection, and in particular of written notation. Though they came very early in our history, they form part of our knowledge *about* music-making, not our musical knowledge per
se. They are part of the rational knowledge employed in the act of composition, but they are not the elements of *composition proper*, by which I mean the aural cognitive judgments, the heard organizations that result in pieces of music...they are not the generic or universal cognitive units of composing and listening. (Serafine, 1988: p. 61, Serafine's italics)

The key passage which will lead the reader to an understanding of Serafine's agenda is in her claim that the so-called elements of music (i.e., tones, discrete pitches, scales, chords, etc.) "form part of our knowledge *about* music-making, not our musical knowledge per se" (See above). Serafine claims that items such as discrete pitches arrive as a concept only *after* reflection upon music, not before it, and that the very idea of such items is notationally conceived, and since notation came *after* music, not before it, such items logically cannot be primary to music. Claiming that such items are *about* music and not music itself. Serafine states that we might just as easily say that such items as scales and chords *refer to* or *describe* music, and being notationally conceived, are therefore historically and culturally situated. Since said items are not deemed to be in the aural-cognitive judgments *per se*, Serafine would have us believe that they are ontologically 'nonmusical.'

On this account, Serafine continues to be motivated by the APV, the difference being that she has taken the notion of musical formalism an important step towards a solipsistic explanation of the musical mind. As she claims, scales and chords, etc., being just talk *about* music, are not the elements of music itself. Since Serafine claims that the essence of music is cognition, it would seem to imply that music cognition exists independently of the outside world of chords and tones, etc. A solipsistic explanation of mind holds that the outside world exists only as an object or content of one's consciousness. The problem is that once we concede to the argument that the objects of sense experience are mind-dependent, it becomes questionable whether we can argue validly as to the existence or nature of a mind-independent external world. The question then arises as to where music resides. According to Serafine, music consists in the "generic or universal cognitive units of composing and listening" (See above), thus defining music as being caused by and located in the cognitive apparatus. It should be noted here that Wittgenstein (1953) challenges the notion that man cannot have a private language because there is a problem which hinges on whether there could ever be genuine rules of use for expressions in such a language. Thus, if there were no correlates between a manifest-world musical language (comprising tones, scales, etc.) and a private musical language (comprising internalized cognitive units), it might be equally valid to argue against a solipsistic view of music as being incompatible with our having a musical language (manifestly conceived) to express it.

The next question arises as to how such cognitive organization (i.e., musical thought) is manifested, or, in other words, what do these processes yield. According to Serafine, the organization of musical thought is manifested²⁹ in the form of such cognitive processes as 'closure,' 'transformation,' 'abstraction' and 'hierarchic structuring' by means of so-called 'temporal' and 'nontemporal' processes. On this account, it would seem that the products of cognition are also its processes. This circular reasoning takes Serafine's theory along a solipsistic path and then down a slippery slope of particularism. The circularity of her argument in effect leaves the external world of sounds (referred to in various ways) completely dependent upon the individual cognitions and said cognitions are said to arise only as a result of a set of formal, self-referential, internal cognitive processes. Thus, following CTM orthodoxy, Serafine posits the cause of music, or as she puts it, "the root of music [as] human thought" (Serafine, 1988: p. 23).

The next question must by force arise as to the cause of human musical thought. The cognitivist view sees human thought as being supervenient upon the human brain. The problem with this line of argument is that it leads down a path of infinite regress. Nevertheless, when we return to our original question, "Where lies music?", we find that such answers resemble less and less the manifest image of music. This is the price we must pay for such unbending adherence to a cognitivist definition which travels in a world of solipsisms, circular reasoning and relativistic subjectivity.

However, it seems that the situation may not be as bleak as I have described. Serafine makes what seems to be an apparent contradiction to the above reasoning when she states that

^{29.} Serafine uses the term, "actively generated" (Serafine, 1988: p. 27)

the present conception may be called one of subjective construction; that is, it leans to the side of the subject insofar as it locates the organization of music events in the activity of cognitive processes (that is to say, organization resides in the mind, not in the piece) but it also presumes the existence-as-object of a finite collection of musical sounds in the external environment. (Serafine, 1988: p. 70, my italics)

If the cognitivist definition of music hinges on the notion of 'subjective construction,' the question arises as to how can there exist at the same time sounds in the environment which are predetermined as inherently 'musical' *before* they are constructed by the mind 'as music.' If Serafine is now suggesting that there are *a priori* 'musical' sounds in the environment, then she is running the risk of a direct contradiction.

Since I do not think Serafine's views on the primacy of the cognizer are going to be that easily shaken, I might suggest that the notion of a predetermined set of 'musical' sounds in the environment seems more likely to point not to a single, isolated subject, but to a subject (or subjects) as a member(s) of a larger community of music cognizers. However, I do detect the hint of a possibility that intersubjectivity plays a part in Serafine's notion of "musical sounds in the environment" when she states that "the object, if there can be said to be one, is a fluid, changing thing, or else there are multiple objects, each constituted from some human/subjective point of view" (Serafine, 1988: p. 67). I have no objection in principle to the above statement, except that the line of cognitive construction is then not going to be necessarily a direct one from the phenomenal sound-object to the cognitive construct, as Serafine claims. There will have to be some level of intersubjective action which influences decisions about aural-cognitive organization—that is, there must exist a community of participants who agree on the status of things 'musical' and who must have a participating role in making decisions about the so-called 'musical' status of phenomenal sound-objects.

If Serafine goes along with this suggestion (and I think that is what she is implying all along), then she must then account for a loosening of the strict formalist hold she places on her theory and ontological framework. A statement one could make such as, "such and such a sound is a musical sound because it has pitch" contributes in a necessary way towards the creation of the musical object, even if it is a statement about a so-called 'nonmusical' object under Serafine's stipulations. However, in my view, such statements become a necessary part of the epistemological baggage that is carried with the act of cognizing *any* sound as 'musical.' This points very strongly to my contention that music is a social construct before it is *ever* a subjective cognitive construct. In point of fact, the act of social construction is the definitive factor in making *all* ontological distinctions about music.

The next task is to define Serafine's boundaries between the subjective, scientific-image world and the external, manifest-image world. Serafine does not give us an explicit answer. If there is in fact a finite world of inherently 'musical' environmental sounds (manifestly conceived), the question arises whether such sounds would relate (and if so, how do they relate) to Serafine's hitherto banished tones, chords, etc.³⁰ Again, there is no clear answer from Serafine. Thomson reaffirms my views on these shortcomings when he states that "this is the deeply embedded problem with the whole book. It is an inability to speak with authority about the whole relationship (or co-embodiment) of external object and internal manifestation. There is no mention of just where the Out There ends and the In Here begins" (Thomson, 1990: p. 27).

Serafine sets out several stipulations contingent to her decision to define music 'as cognition.' Some of them have been discussed earlier, but it is perhaps appropriate at this point to make a summary. The first stipulation, discussed earlier, is that music is subjectively constructed.³¹

The second stipulation, discussed earlier, is that for aural-cognitive activity to be 'musical,' it must have to do only with sound and, as she states, "excludes all thinking that does *not* involve sound" (Serafine, 1988: p. 70). Serafine follows this with a corollary that states that "words may be defined as music to the degree that it is their temporal and sound qualities that are entertained" and not "if it is their semantic meaning that is the focus of attention"

^{30.} I may have alluded to a possible answer in the previous paragraph.

^{31.} I shall introduce another related matter shortly, that is, the subsequent problem of reconciling this stipulation with her statement in Chapter 2, that "music is a cultural phenomenon" (Serafine, 1988: p. 29).

(Serafine, 1988: p. 70). I am not sure with this last clause whether Serafine is unintentionally broadening the scope too far to suit the stated conditions for her definition of music. Clearly, Serafine appears to be entering into the long debated issue of the predominance of words and music, in terms of song, opera, etc. Although a discussion on that specific issue is not within the parameters of this study, I shall take Serafine's statement at face value and interpret it simply as a reinforcement of an APV-based concept of music.

Serafine makes a third stipulation that "the mention of *human* aural-cognitive activities is meant to exclude environmental and animal sounds such as traffic noises, doorbells, and birdcalls that occasionally make their way into the artform" (Serafine, 1988: p. 70). I interpret the above to mean that the community or the subject (as a participating member of a community of participants in music) decides which sounds are 'musical' and which are not. I make that interpretation on the basis of Serafine's contention (discussed earlier) that there exists a set of so-called 'musical' sounds in the acoustical environment. This stipulation goes hand in hand with the next, in the sense that not only does the community of musical participants have a necessary role in deciding the repertory of 'musical' sounds, but that the community even has a participatory role in the organization of said sounds.

Serafine makes a fourth stipulation that "the condition of *organized* temporal events omits from the musical category both randomized and totally serialized sound collection (as in aleatoric and serial musics) that remain unorganized by the listener. (Often, however, music can be meaningfully heard irrespective of the techniques of its generation, a fact that allows a measure of aesthetic legitimacy to compositions that would otherwise be crippled by their music-as-object condition" (Serafine, 1988: pp. 70-71, Serafine's italics). I take Serafine to mean that if the subject cognitively organizes certain (aleatoric, etc.) sounds *as music* then that is a sufficient criterion for making such a decision, even if the cognizer makes that decision irrespective of the method of generation of those sounds (in the environment). The problem with the above stipulation is that *any* sounds (not just serialized and aleatoric styles) that are *successfully* constructed by the subject (according to the above stipulation) must be admitted into the 'musical' category. It would seem that we are back to saying that the subject is the sole arbiter of deciding what sounds are 'musical.' As quoted earlier, Serafine states that a piece of music "is not a fixed, external object, but an abstract and fluid one that rests on human cognitive construction in all phases of its existence." (See above). The problem is that the so-called "meaningful hearing" alluded to by Serafine is still dependent upon an individual's unique organizational processes. However, I contend that such individualistic decisions are not substantive enough to cognize music successfully in terms of a given style or genre. Otherwise, a potentially extreme variance of cognition among all subjects and especially among sophisticated and naive listeners for anything but the least complex music would result. (Refer to my earlier argument against the notion of a private musical language.) However, I shall shortly elaborate on the above point with a discussion of Serafine's thoughts concerning so-called 'style-specific processes.'

With the ongoing insistence on the primacy of subjective judgment, Serafine is perched at the summit of a slippery slope towards relativism. To give Serafine's model a ring of authority, there would have to be wider theoretical constraints that would make successful cognition possible for anything but the most well-known tunes. Unfortunately, Serafine offers the reader no hope for a solution to this pivotal issue. As mentioned earlier, one has to ask what is in fact yielded by the cognitive processes as proposed.

7.4.2 Problems with the model

7.4.2a The temporal processes

In this section, by way of illustration, I propose to offer a quick commentary concerning specific aspects of problems in the model having to do with so-called 'temporal processes.' The bulk of my complaints concerning the 'temporal processes' relate to the aforementioned ontological temporal-events-described-in-sound problem.

Concerning 'tonal synthesis'³² (as one of the 'temporal processes'), two questions arise. Recall that 'tonal synthesis' occurs when two or more tones sound simultaneously. Serafine describes a triadic chord as being an example of 'tonal synthesis.' I take issue with Serafine on two counts. One, if one were to take into account pieces of piano, guitar or harp music which employ a quick arpeggiation of harmonic material, the question arises whether listeners cognize each note of the arpeggio separately or as complete units of harmonic change, or even texture. Serafine offers no suggestions as to how the model would handle this distinction. Two, there also may be a problem in Serafine's implying that a triadic chord actually occurs when three voices in a sixteenth-century polyphonic composition sound simultaneously in an triadic arrangement. Taking the point of view of sixteenth-century musical participants, a chord probably was not intended in such situations and likely was not heard as such because the notion of chords was not fully developed in this period of musical history. Musicologists might suggest that a sixteenth-century listener might not comprehend the three tones as anything but three separate tones in three-voice polyphony. Listeners in different eras "hear" differently because of cultural conditioning, and hearing such an event "as a chord" (or as three separate voices) is more a factor of cultural conditioning than a result of naturally instantiated processes.33

Concerning 'motivic synthesis,' I am not sure whether two motivical figures can ever combine to produce a new whole without being in conflict with the notions, 'tonal synthesis' and 'succession.' Part of the problem stems from Serafine's reversal of the 'sound-time' conceptual framework. In Serafine's conceptual musical economy (which conceives temporality as the vehicle of sound), 'motivic synthesis' gains value, since the sound events might be said to "carry" the time. In the traditionally conceived situation (with temporality as the conceptual

^{32.} Recall that this label is my contribution, since Serafine does not specifically name the process.

^{33.} My arguments in Chapter 6 concerning the questionable applicability of applying tonal music processing-rules for the cognition of contemporary musical idioms has a certain resonance here.

vehicle), motivic events sounding simultaneously maintain discreteness because the sound is the focus, not temporality. A friction thus arises between the two views which, in my view, Serafine does not resolve.

Concerning 'textural abstraction,' I contend that yet another problem arises in terms of Serafine's 'time-in-sound' ontological framework. One has to ask whether it would not be more logical (in terms of the traditional 'sound-in-time' paradigm) to suggest that simultaneously occurring (but not parallel) events occurring in a temporal "vehicle" create a new texture as a combination of two timbres. In my view, if the conceptual "vehicle" is sound, and the events are conceptually temporal, as Serafine suggests, then each temporal event would then have to be ontologically separate (being in its own "sonic vehicle"), thus rendering 'textural abstraction' as a cognitive process an impossibility.

7.4.2b The nontemporal processes

In this section, I propose to comment on the proposal Serafine makes for the existence of so-called 'nontemporal processes.' Recall Serafine's explanation that the 'nontemporal processes,' existing at a deeper cognitive level than the 'temporal processes,' deal with formal, logical and abstract operations.³⁴ Recall that the 'nontemporal' processes subsume four operations: 'closure,' 'transformation,' 'abstraction,' and 'hierarchic levels' (also referred to as 'hierarchic structuring').

As explained by Serafine, the notion of 'closure' has two dimensions: one, the action of coming to a stop; and two, stasis, the state of being in a "stopped" condition. In music, 'closure' is often illustrated by the perfect cadence—that is, the movement of coming to a full stop as in a dominant to tonic harmonic progression. There is a tension created in the dominant chord which is resolved in the movement (progression) to the tonic. In Serafine's conceptual

^{34.} As I have stated earlier, the labels 'temporal' and 'nontemporal' create a certain confusion, because ontologically, all music is temporal. I have suggested that more appropriate appellations for the term, 'temporal' might be 'surface-level' or 'real-time' processes and for the term, 'nontemporal,' replace it with 'deep-level' or 'formal' processes. As well, the notion of a 'nontemporal' process is worrisome.

framework, a 'nontemporal' process such as 'closure' is described only in terms of the final state of stasis. Serafine correctly states that in tonal music, dominant-function chords represent instability and tonic-function chords represent stability. However, according to Serafine's stipulation, 'closure' is represented only by tonic-function chords, representing only the second half of the equation, the resolution chord.

However, it is curious that Serafine does in fact imply movement in 'closure' when she states that "closure brings us to rest, to the end of a section or piece" (Serafine, 1998: p. 80). A possible solution to this apparent snare might be if Serafine were to refer to 'closure' as a cognitive symbol. By creating a symbol, the sense of temporality (and the subsequent implication of movement) is removed. In that sense, 'closure,' symbolically represented, might be better thought of in terms of a computational operation. Perhaps, without being explicit, Serafine may in fact be alluding to a computational (read 'symbolic') cognitive level in her postulation of 'nontemporal' processes. A good question might be whether the 'nontemporal' level (interpreted as a level of symbolic processes) has causal powers and as such, is it responsible for generating effects at the 'temporal' level? It might even be that the two levels (both having causal powers) operate independently and interact with each other. Another question points to the cognitive accessibility of the 'temporal' and 'nontemporal' processing levels: that is, are they both or is one or the other cognitively accessible (or inaccessible)? Unfortunately, Serafine does not supply answers to these pertinent questions. It would seem that any model adhering to a CTM thesis would have detailed explanations in this regard. If, in fact, Serafine were to be more explicit in giving the reader information concerning the above, she might give her theory the added advantage of more closely connecting her model with general cognitivist theory of mind.

Recall that Serafine defines 'transformation' as "responsible for many unity-generating effects in music, for it results in the awareness of similarity in the face of ostensible differences...[and is] the more general source or cause for similarity/difference relationships" (Serafine, 1988: pp. 80-81). At least as far as 'transformation' is concerned, it would appear by the above statement that 'nontemporal' processes (resulting in so-called "heard" relationships) have causal properties. Once again, my complaint is that Serafine is not clear as to the cognitive accessibility of 'transformation.' As I interpret her, Serafine fudges slightly on that issue (see above citation), but in any event, the door seems to be open to that possibility. Otherwise, the resultants of 'transformation' may be said to be in themselves simply projections at the level of cognitive accessibility. Whatever the case may be, there is too much of a gamble in speculating on the possibility of whether Serafine intends 'nontemporal' processing to be a component of the computational processing level or whether it is a component at the level of introspection. We do know that Fodor claims the computational level to be cognitively inaccessible. Nevertheless, the notion of so-called "similarity/difference" symbolic relationships is reminiscent of the Turing model. One reading of the above could result in viewing the 'nontemporal' processes as projecting their results to the listener in the form of "heard" (i.e., "cognized") properties. Nowhere does Serafine give the reader complete assurance on that count.

Surprisingly enough, whether or not such computations are cognitively accessible is not the real issue here. The real issue for this study is whether 'temporal' processes (as explained) have more to do with how the listener hears music as it manifests itself or whether a discussion of 'nontemporal' processes deals more with the idea of unobservable (i.e., scientific level) processes. In essence, Serafine seems to be prescribing a mechanism (scientifically conceived) which does the work of making sense to a listener (i.e., making the listener aware of) the array of sensory data which it constructs as "music." Thus, according to Serafine, the listener "hears" similarity/difference relationships only *after* the 'nontemporal' processes have projected their results to the cognitive awareness of the listener. To this end, Serafine states that "transformations result in *aurally perceived* similarity or at least *aurally experienced* unity and cohesiveness" (Serafine, 1988: p. 81). Unfortunately, the problem stems from Serafine's failure to provide clear information as to the causal source of 'nontemporal' processes. She also does not say much about whether such processes are particular to the cognitive processing of music or whether they are a component of general cognitive processing. With such answers, the reader might have a better basis of understanding the model in more the general terms of cognitivist theory of mind. Serafine states that certain 'transformations' may be perceived and others not, except as "new, unrelated material" (Serafine, 1988: p. 83). Serafine's point retains validity only so long as she maintains the stipulation that music cognition occurs exclusively within the aural-cognitive domain. Of course, I do not disagree that certain more abstract or complex 'transformations' may remain undetected by the average (untutored) listener, especially if the tools for perception are postulated as limited to straight audition with no background concepts aiding in interpretive processes. For this reason, the argument that Serafine's model promotes in this regard tends to border on the incredible because I think Serafine's argument is not based in the everyday reality of how a listener can (and often does) approach music. Let me use an example.

For instance, without being acquainted with the concept for retrograde inversion, I doubt very much whether an untutored listener could ever become aware of so-called 'transformations' in a passage of twelve-tone music. My reason for saying so is that I very strongly suspect that 'transformation' is not in fact a natural (i.e., inherent) feature of the music cognition apparatus in the first place. For example, retrograde inversion is a concept that must first be learned and then applied to specific instances, whether it is used in music or in rows of beer labels. It is my contention that listeners tutored in the concept of retrograde inversion can actually learn to "hear" (i.e., cognize) the results of the use of that technique in a given musical passage.³⁵

In short, I wish to debunk the APV-based notion that directed learning about such concepts as retrograde inversion must be characterized as 'nonmusical': that is, that the *only* learning that is deemed 'musical' is that which is limited to the aural-cognitive domain. As I shall demonstrate in Chapter 9, the apprehension of some musical idioms *requires* a conceptual component for a full and proper understanding and enjoyment. There is nothing wrong with that. I contend that the conceptual component is an allowable (and welcome) and arguably

^{35.} I, and other trained musicians have acquired the ability to perceive aurally (or conceive for compositions) such features in music as inversions, retrograde or otherwise.

necessary feature of the apprehension of music. I also maintain that the use of adjunct concepts are part and parcel of a person's interpretation of any or all music.

Throughout the description of 'nontemporal' processes, recall that Serafine postulates such processes as generic to and inherent in the musical cognitive apparatus. Unfortunately once again, as with the other aspects of the 'nontemporal' processes, Serafine does not clarify the status of 'hierarchic structuring' in terms of its role in the musical cognitive economy, and particularly in terms of its cognitive accessibility (and by extension, in terms of its voluntariness or involuntariness). I bring the notion of voluntariness into the picture because Serafine does not say whether 'hierarchic structuring' of the cognizing apparatus is refined through accumulated experience in a particular musical idiom. The only hint we are given in that respect is that 'hierarchic structuring' (and the other 'nontemporal' processes) might be a factor of development.

7.4.2c Simultaneity and succession

It is important (and crucial to my general thesis concerning the supervenience issue) to be critical of Serafine's approach to describing simultaneous musical events as "vertically imposed on one another." First, I wish to make the point that there is nothing intrinsically vertical *or* horizontal about simultaneous and successive musical (i.e., sonic) events. However, the language used to describe such cognitive events is embedded in a particularized manifest image of music arising from the vertical and horizontal characteristics of Western musical notation. There is nothing intrinsic to a cognitive process which constructs representations of external musical events that could be properly described as being literally "vertical" *or* "horizontal." I suggest that these are metaphorically descriptive terms at best and are best treated as terms characteristic of descriptions of chords and melodies as they appear in Western notation.

It would seem then, with Serafine's descriptions, that the terms, 'verticality' and 'horizontality' (expressed by Serafine as 'simultaneity' and 'succession') cannot, within the stipulations of her theory, be properly called 'musical' terms, for the very same reasons that she

says that "scales and chords do not exist in music" (Serafine, 1988: p. 53). 'Succession' and 'simultaneity' have to be taken as (metaphorical) terms *about* music, not music itself, and as such, they describe music under a very restricted set of parameters (i.e., specifically in terms of Western musical notation). Because the concepts, 'succession' and 'simultaneity' seem to be culturally derived, there may be some question as to their universality. Perhaps there is reason to state that the notion of 'verticality' might be particular to participants of *some* Western musical idioms and potentially nonexistent to participants of others. If so, the only choice that I see remaining for Serafine is to posit 'verticality' as a Chomskian (i.e., innate) capacity which awaits activation. However, although Serafine alludes to virtually none of the broader psychological theories, I doubt whether she is a Chomskian, especially in light of her developmentalist assertions. Unfortunately, the reader is given no information in that regard.

In passing, I shall revisit the notion of 'melodic contour.' For similar reasons given in the previous paragraph, there is nothing intrinsically contour-like about a representational cognitive process that constructs a representation of a melody as literally going "up" and "down." If one hears a fire engine siren wailing one does not necessarily cognize the oscillation of the siren as a contoured shape unless it has been previously described in this manner. There has to be a conceptual referent that is contour-like for the comparison to hold. In terms of Serafine's formalist aesthetic ontology for music (and the stipulations of the APV), a description of a siren (or a melody) in terms of 'contour' can only be categorized as 'nonmusical.' Serafine is trying to have it both ways.

Similarly, if one hears a siren and a screech of tires simultaneously or successively, one does not necessarily "hear" (or cognitively construct, to use Serafine's term) those sounds as being in a vertical or horizontal arrangement. They just happen together or one after the other. Melodies do not literally go up and down and chords do not literally have tones in a vertical arrangement. That is just a metaphorical way of describing certain musical phenomena. As stated above, the various concepts, 'verticality,' 'horizontality' and 'contour' belong to the manifest world of Western musical notation. The notes are arranged in various ways on the

page as a representation of musical sounds. These concepts have to be taught through direct instruction in order to conceive of them in this way. For that reason, those terms belong strictly to the set of categories instantiated in the manifest image of music. Without a preconception of verticality or horizontality, there is no possible way to predict how a person would cognitively construct simultaneous or successive events in terms of verticality, horizontality or contour. My hypothesis, therefore, gains currency, specifically in terms of my point that the scientific-image descriptions of music depend on the manifest image for its terms and categories. With that in hand, it is clear that the scientific image of music is also supervenient upon the manifest image, and if so, then the claims of causality as proposed by CTM come into question.

7.4.2d Style-specific processes

Since there is little in Serafine's discussion of 'style-specific' processes which serves to illuminate her theoretical model, I have placed this section within the body of critical commentary (rather than in the description of the model). In the interests of clarity, I shall follow with my critical commentary immediately after introducing each item in Serafine's explanation of 'style-specific' processes and the role of musical communities.

At the beginning of Chapter 2, *The Idea of Music as Cognition*, Serafine states that "music is a cultural phenomenon. To say so is to emphasize that it is born of groups of persons—here called musical communities—who share common understandings about the way music is to be composed, performed, and heard" (Serafine, 1988: p. 29). Taking the opposite tack in Chapter 3, *Some Processes*, Serafine defines music as "the activity of *thinking* in or with sound and for this reason I favor the term musical 'thought' or 'cognition' over 'music' alone. Musical thought may be defined as human aural-cognitive activity..." (Serafine, 1988: p. 69). Serafine states later in Chapter 3 that her conception (of music) "may be called one of *subjective construction*; that is, it leans to the side of the subject insofar as it locates the organization of musical events in the activity of cognitive processes (that is to say, organization resides in the mind, not the piece but it also presumes the existence-as-object of a finite collection of musical sounds in the environ-

ment" (Serafine, 1988: p. 70, my italics). In this section, I shall attempt to reconcile these two apparently polar views.³⁶

The above quotes are paradigm examples of the conflict that persists in CTM in relation to the manifest and the scientific images of music. Serafine's second quote in the paragraph above defines music from the scientific point of view, but she nevertheless must pay respect to its manifest existence as "a collection of musical sounds in the environment." It must be emphasized that said musical sounds are not described as natural (i.e., environmental) sounds but rather as being *culturally created*. The respect Serafine pays to the external musical environment is evidence of the difficulty many models of CTM face in attempting to reconcile the manifest image of music with their scientific views. An important consideration concerning the question of the causal source of music often centres on the notion of musical style (or idiom). A musical style denotes a commonly shared body of surface features utilized by a group of participants (i.e., composers, performers, listeners). Serafine argues that the cause of a given musical style is found in the community of participants. She states that "common features *exist at all* in a body of compositions because shared principles are in use by the composers and listeners *who generated the style*" (Serafine, 1988; p. 29, my italics).

On the other hand, Serafine states that musical styles such as classical, jazz, folk, or rock (and substyles such as baroque, Dixieland, blues, or heavy metal) involve "principles [which] are of necessity cognitive principles. They are adhered to, if not wholly consciously, by composers who create music and listeners who understand it" (Serafine, 1988: p. 30). It seems from the above that Serafine is reversing her earlier claim by now favouring an individualist causal story for musical style. In fortifying the cognitivist answer, Serafine states that the longstanding existence of the general classical tonal style (including its many substyles) is "evidence that consistent *cognitive* principles, for composing and hearing, are put to use in

^{36.} I have discussed the latter part of the above quote in an earlier section. My intention here is to examine critically how Serafine reconciles these two apparently opposing views of positing the source of music on one hand as a "cultural phenomenon" and on the other as a "cognitive phenomenon."

constructing music that is experienced...as divisible, well-balanced, and varied" (Serafine, 1988: p. 30). This statement, in effect, implies that Western tonal music is cognitively natural and only a product of individualized cognitive processes.

However, in explaining the phenomenon of style change, it is curious that Serafine does not offer a specifically cognivitist answer. She does allude to the "concomitant changes in listeners' cognitive processes" (Serafine, 1988: p. 32), but that is more an observation of a result rather than a statement of cause. I have no objection to her claim that listeners' musical thoughts will change after encountering different styles or idioms, but I contend that the more interesting and important task for a psychology of music would be to assess cause, not effect.

Mysteriously however, Serafine gives a "nonmusical," "nonaesthetic" and "noncognitivist" answer to account for style change. She states, without qualification, that

a possible explanation is that style change results from a subtle but definite interaction—even a discourse—that goes on among composers, listeners, and performers, combined with a tendency among music-makers and audiences to seek new and interesting variations on the musical climate at hand. Part of the implicit agreement between music-makers and audiences seems to be the generation of slight variations on the shared rules or principles of a musical style. Something of the "bending of the rules" takes place, and the style gradually though continually changes. (Serafine, 1988: pp. 31-32)

This explanation for the causes of style-change does not adhere to the strict formalism required by CTM specifically because it does not remain within the required restrictions provided for in the aural-cognitive domain. On the contrary, Serafine's explanation is effectively a sociological one. Her explanation for style change centres on the interactive verbal and performative communication of musical participants in a given musical culture. By providing a sociological explanation for style change, Serafine is actually giving the reader an explanation of style change in terms of the manifest image of music rather than an orthodox scientifically-oriented explanation that cognitivist theories of music are purported to offer.

However, Serafine runs into trouble in terms of her discussion of musical communities in relation to Schoenberg's invention of twelve-tone serial technique. First, Serafine defines a *musical community* as a group of "composers, performers, and listeners associated with a particular style...[and] all styles have musical communities that create them, however small that

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community may be" (Serafine, 1988: p. 33). Serafine then refines this pairing of the notions of style with community when she states that

the emphasis on community interaction is meant to underscore this point: *True style* is a cultural matter and it is never instantaneously in isolation from some audience (however small). No single person sets out alone to create a system of style principles. Rather, such principles evolve gradually from composer/listener interaction, and they are *always* the result of group-human forces. Style, in the sense I propose it here, is analogous to a language or system of discourse, the shared understandings of a group, and not to, say a personal, idiosyncratic code. (Serafine, 1988: p. 33, my italics)

Serafine attempts to debunk the idea that twelve-tone technique constitutes a musical style. She states that "such a technique is not an element of style within the definition of style, meaning cognitive principles, that I propose here. Put otherwise, not all of the things that composers do, or that can be uncovered through analysis, are stylistic principles" (Serafine, 1988: p. 34). She states (incorrectly) that since Schoenberg reputedly invented twelve-tone technique in isolation, it does not qualify as a style because listeners have trouble hearing tone rows.³⁷ Because tone rows are difficult to hear, Serafine states that "we must draw the conclusion that the particular configuration of notes [in rows]₁|s unrelated to the cognitive principles of hearing and composing that people use for this music, even in its own community" (Serafine, 1988: p. 34).³⁸ Serafine comes to this conclusion of style principles" (Serafine, 1988: p. 34).³⁸ Serafine comes to this conclusion of style principles" (Serafine, 1988: p. 34).³⁸ Serafine comes to this conclusion of style principles" (Serafine, 1988: p. 34).³⁸ Serafine comes to this conclusion of style principles" (Serafine, 1988: p. 34).³⁸ Serafine comes to the conclusion of style principles" (Serafine, 1988: p. 34).³⁸ Serafine comes to the conclusion of style principles" (Serafine, 1988: p. 34).³⁸ Serafine comes to the conclusion of style principles" (Serafine, 1988: p. 33).

This line of thinking requires unpacking. Serafine has stated that the elements of a style, amounting to a style itself (as the sum of its individual features), must adhere to commonlyshared cognitive principles.³⁹ In other words, if a piece of music using a given compositional technique cannot be *heard* (that is, successfully cognized, under Serafine's requirement of

37. See my comments to the contrary in Chapter 9. Briefly, Schoenberg's innovations are a product of the extreme chromaticism that was prevalent in late nineteenth-century music.

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38. See Chapter 9 for an argument to the contrary.

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39. Those cognitive principles are outlined in the description of the theoretical model.

unified, formal organization) by a listener or group of listeners in a musical community ("even aficionados of the style") (Serafine, 1988: p. 34), then that piece cannot be given the status of being a token of a musical style. This conclusion cashes out to mean that it is the community of cognizing listeners, not the creative artist, who determine musical style. Not only is that conclusion misleading, it also implies that natural cognitive principles held by the group are determinants of style.

I see two problems with Serafine's view. First, Serafine states that "the hearing of true row orders is rare if not impossible" (Serafine, 1988: p. 34). Serafine's conclusion in the above paragraph implies that a composer inventing a new compositional technique does not actually *hear* the features of the newly-invented style. That is, we must conclude that Serafine means to say that Schoenberg, Webern, Berg and the hundreds of composers employing twelve-tone technique throughout this century cannot actually *hear* twelve-tone rows. That assumption is obviously untenable. It is also untenable to assume that participants (i.e., listeners and performers) in the twelve-tone style cannot acquire a capacity to *hear* twelve-tone music because it conflicts with given cognitive principles. However, it may well be discovered in the future that participants in twelve-tone style may not actually *hear* twelve-tone rows without the aid of the *concept* of a tone row any more than participants of common practice tonal music can *hear* tonal movement as an elements of that style without the aid of the concept of tonal functioning. Serafine's conclusions about the hearing of twelve-tone rows is dependent upon an APV-based stance in what constitutes musical 'hearing'; that is, so-called musical 'hearing' must be restricted to the auditory-cognitive domain. At any rate, it is generally assumed in CTM dogma (being biased in favour of restricting its discussions of ontology to the auditory-cognitive domain) that conceptualization through direct instruction does not affect musical 'hearing.'

The second problem concerns Serafine's conclusion which implies that the community determines what art is, not the artist. Sam Green, in commenting on a work of conceptual art, argues to the contrary that the community does not determine what art is, especially when it comes to the paradigmatic twentieth-century notion of conceptual art. He states that a conceptual work of art...is as much valid as something you can actually *see*. Everything is art if it is chosen by the artist to be art. You can say it is good art or bad art, but you can't say it isn't art. Just because you can't *see* a statue a statue doesn't mean that it isn't there. (Green, Sam, Oct. 2, 1967: *The New York Times*: p. 55, my italics, in Beardsley, 1970: p. 13, ed. J. Margolis, 1987)

I have italicized the word "see" in the above quote in order to elicit a parallel with Serafine's use of the word "hear." Green brings to our attention the fact that a communitypossessed set of cognizing principles in the visual-cognitive domain may be insufficient and even possibly unnecessary in the determining of the status of a work of art. Artists determine the status of artworks and therefore are the potential creators of new styles. Nevertheless, the determination of new style, especially throughout the history of twentieth-century art, is more a factor of the work of individual artists than is it due to general recognition by the community. As I will elaborate in more detail in Chapter 9, the developments in this direction may in fact be the emblematic shift this century has witnessed in terms of the creation and the perception of all art.

7.4.2e Musical reflection

It is on the subject of 'reflection' that Serafine's theory deviates from the strict APV paradigm she promotes in the description of her theoretical model. Serafine states that "people think about their music. They reflect on it in order to see how it works and to see what it is they are doing when they engage in it" (Serafine, 1988: p. 36). At first glance, there is nothing intrinsically strange about that statement, except when it is interpreted in relation to the stipulations of Serafine's theoretical model. Serafine makes it clear that *post hoc* 'reflection' (i.e., scales, chords, etc.) is ontologically *not* music cognition, because such reflection is outside the strict parameters of the aural-cognitive domain. She insists that 'reflection' may be cognition, but it is not *music cognition*. However, Serafine hints at two aspects worth examining in terms of the notion, 'reflection.'

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Let me unpack the problems with the term. First, Serafine states that 'reflection' upon a rhythm results in its being "abstracted and represented" (Serafine, 1988: p. 36). The implication is that 'nontemporal' processes such as 'abstraction' can potentially result from 'reflection.' In other words, one interpretation of 'reflection' might be that it can be understood as a potential cause of 'nontemporal' processes such as 'abstraction.' That, however, would seem to be in contradiction with the tenets of the theoretical model. According to Serafine, 'nontemporal' processes (such as 'abstraction') are solely and exclusively the product of activity within the aural-cognitive domain and exclusive of such activity as conceptualizing. Therefore, 'reflection' is, according to Serafine's stipulations, deemed strictly a 'nonmusical' activity, and therefore must remain outside the defined domain of music cognition.

Second, Serafine admits to the possibility of the element of *consciousness* being integrated with the notion of 'reflection' when she states that "we do not know the degree to which conscious reflection is a universal characteristic of the world's musical communities, but reflection is certainly the rule where a community has developed one or both of the following ideas: (1) *The idea of a composition...*(2) *A written notation of music*" (Serafine, 1988: p. 36-37, Serafine's italics). If in fact the possibility exists that a participant's conscious 'reflection' upon a composition or bit of notation is connected with a 'style-specific' process, the important question is whether such reflection qualifies as an act of music cognition. By Serafine's definition, it should be assumed that it cannot. If such conscious reflection were in fact to qualify as a feature of music cognition, then the water would further be muddied because the stipulated involuntariness of music cognition would be brought into question.

Some concluding remarks are in order. Inasmuch as Serafine reserves a definition and a description of the actual activities of music cognition for the chapter following the discussion of 'style-specific' processes, one has to ask what part various activities such as reflection, style transmission and pedagogy have in the conceptual framework for her model of music cognition. Since the such activities are presumed (by definition) by Serafine to be intimately connected with 'style-specific' processes, which are in themselves intimately connected with musical

communities, the question then arises whether such activities qualify as music cognition at least in some peripheral manner. Serafine does not offer an explicit answer in this regard, but by process of elimination, one has to conclude, by her definition of music cognition ("as the activity of *thinking* in or with sound" (Serafine, 1988: p. 69)) that such activities as reflection, etc., do not in any way qualify as music cognition. This is particularly so because such activities are conceptually-based and as such, are outside the aural-cognitive domain. An APV-based view of music cognition requires a straight-line immediacy in terms of the perception/cognition framework, with no participation of intervening, that is, so-called 'nonmusical' concepts in the act of music cognition. Thus, the reader is left to conclude that 'style-specific' processes are *about* music, not music itself, and therefore not (by definition) a matter for music cognition.

Nevertheless, the nagging question remains as to what processes in Serafine's model finally do comprise the activity of music cognition. By elimination, the reader is left to conclude that the 'generic' musical-cognitive processes (with their 'temporal' and 'nontemporal' subdivisions) are the only processes that fully qualify as the only "real" components of music cognition. Thus, all the interesting aspects of musical activity, those having to do with style and musical communities, remain outside the ontological framework for cognition which is specifically labelled *music* cognition. The remaining acceptable activities, for a clear cognitivist definition of music cognition, are dictated by the stipulations of the APV and a strict adherence to the scientific-image supervenience mode.

7.5 Conclusion

It is unfortunate that so much speculation has been necessary in grappling with Serafine's theoretical model. If I have been on or near the mark in my guesswork, Serafine might have a far more interesting (and internally valid) theory if more reference was made to the broader context of general cognitivist theory of mind. Thomson echoes my worry when he states that the book cries out for some broader psychological theory that can make sense of just how the structuring of experience takes place. But there is a haunting silence about such matters, a lonely absence of ideas from some of the giants of psychological history, people who have grappled with the ultimate problems of how we know the external world and how we process the clues of its nature. (Thomson, 1990: p. 28)

As Thomson suggests, Serafine leaves far too many questions left unanswered especially in terms of where the phenomenal object ends and where cognition begins. Recall Thomson's observation that Serafine's book reveals an "inability to speak with authority about the relationship (or co-embodiment) of external object and internal manifestation. There is no mention of just where the Out There and the In Here begins" (Thomson, 1990: p. 27). I would go further to suggest that real problems persist with the model because there is little explanation of functional roles and the relative cognitive accessibility of the 'temporal' and 'nontemporal' processes, especially so since such processes are deemed to be central categories in the musical cognitive economy.

Serafine does not ameliorate the situation in her claim that "ordinary perception is a necessary companion to the understanding of music, but the study of it is no window on how musical understanding occurs" (Serafine, 1988: p. .92), However, that comment is only a deflection of the really important issues being brought to the fore in this study. The issues I am dealing with are not so much directly concerned with the debate whether music cognition is more or less a matter of perception or cognition as with the upside-down relation CTM sets up between the manifest and scientific images of music. As I have noted, the problem is that Serafine is not clear whether such processes as 'abstraction' or 'transformation' occur solely as a matter of deep-level cognition or whether they also serve just as well as *post hoc* analytical operations or even as organizational steps (manifestly conceived) a composer might follow in the organization of sonic material for a composition, or whether such processes function in terms of any and all the above. In fairness, Serafine does stipulate that the line of cognition runs from phenomenal object to receiver, the receiver variously being a composer, performer or listener. However, she confusingly stipulates that cognitive processes *among* musical partici-

pants may be of a different kind. Inasmuch as Serafine offers no details of such processes, it muddles rather than clarifies the issue of the cognitive relation among members of musical communities.

The other problem infecting the 'temporal processes' model is that the examples given to illustrate the theoretical typology are too largely derived from the Western classical music repertoire, reminiscent of L/J's intention to induce 'preferential' processing rules for particular musical idioms from examples from the Western classical tonal music idiom. If there is a problem with L/J's approach in this regard (as I have earlier indicated), then a similar problem persists as to the external validity of Serafine's hypothesis for so-called 'generic' musical cognitive processes.

As we shall see in the next chapter, Harold Fiske begins and strongly premises his account of music cognition on that very criticism. Fiske's project is to offer a description of the underlying (i.e., generic) processes that *lead to* the postulations of theories such as the 'generative musical grammar' model. In doing so, Fiske challenges the external validity (i.e., the universality claims) of approaches built on the features of particular musical idioms. In relying upon manifest examples of musical idioms to the extent that such models do, Fiske maintains that such theories will not cease in failing to achieve the desired cognitivist agenda of the identification of cognitive musical universals.

Chapter 8

The Rule Management System Model

8.1 Introduction

The 'rule management system' model seeks to test the hypothesis that there exists in humans a generic cognitive music processing capability which accounts for all musical styles. This model of music cognition is founded on the 'hard' construction paradigm, which Fiske describes as "attribut[ing] realized percepts and tonal-rhythmic patterns exclusively to a processing system governed by the implicitly known rules of a culturally determined music system" (Fiske, 1992: p. 366). On the 'hard' construction paradigm, percepts realized from rule-based computations may or may not distinguish between any invariance resulting from sensory organization. Variance in subsequent processing, however, may be due to mitigating factors such as musical experience and/or musical knowledge. However, if a distinction were to be made between the 'hard' and the 'soft' paradigms, sensory organization on the 'hard' construction paradigm is deemed to be invariant and the remainder is deemed to be the business of genuine cognitive activity. Recall that proponents of the 'soft' construction paradigm tend to view perception and cognition as one cognitive operation.

Fiske sets his model of music cognition apart from H/C's, L/J's and Serafine's by introducing a third principal component into the theoretical design. Theoretical models such as those developed by the aforementioned are structured as 'two-component' theories, consisting of a processing-rule set and a description of the tonal-rhythmic patterns resulting from the computations exercised by said rule sets. According to Fiske, 'two-component' theories are interested only in the descriptions of the rule sets themselves and/or of the products of computation, whereas 'three-component' theories (such as his) have an additional interest in the actual processes involved at the decision-making level.

As Fiske states, the third component (the decision-making activity) "leads to realizing those musical structures and interstructural relationships [described by two-component theories]. The result of this description is knowledge—for example, about pattern P and its

function with respect to some other pattern K" (Fiske, 1992: p. 374). The motivation behind introducing pattern decision-making activity as a third component is that in 'two-component' theories (in particular, the 'generative musical grammar' model), the sets of rules are reputedly not sufficiently anchored. Fiske criticizes 'two-component' theories as being too dependent on induction for the development of rule sets. Fiske's solution is to internalize further the seat of music cognition and identify it as a generic system that manages the rules sets themselves. Thus, as Fiske states, the 'three-component' system follows a protocol which involves three steps:

1. The detection and identification of tonal-rhythmic patterns as controlled by style-specific rule-based processing.

2. Comparison of patterns by means of a generic set of decision-making stages; realization of the dynamics of musical structure, pattern function, and interpattern relationships.

3. Representation of patterns by a set of encoded features for the purpose of pattern storage, recall, and recognition. (Fiske, 1992: p. 374)

Fiske's stated intention is not to replace or displace the two-component models but rather to clarify and amplify them in terms of identifying the causal source of the processes so identified. Inasmuch as musical mental constructs realized through overt performance or composition are important, Fiske maintains that cognitive decision-making structures are logically prior to resultant mental constructs emanating from composition, performance and/or listening. To this end, Fiske states that

an experimentally supported rule management system sorts out which rules are useful descriptors of musical pattern realizations and which are not. They take on flexibility because a rule management system would have to be generic, offering the same structure or control over cognitive processing for any of the world's musics. That is, it would have to fulfill the pretheoretical assumptions...concerning pattern construction, pattern management and organization, universal versus idiom-specific musical components, and acculturation. (Fiske, 1992: p. 375)

The design of the 'rule management systems' model is based on a number of pretheoretical assumptions or axioms, which I shall outline in Section 8.3. Although a critique of the model could very well focus on individual features of the model, this study, as previously indicated, finds its primary focus in terms of the similarity of the philosophical views adopted

by each theory. My primary concern is with two such views underlying Fiske's theoretical design: first, the APV, which predetermines the ontological status of the terms, 'musical' and 'nonmusical'; and second, the scientific view of music, which endeavours to determine the essence of music as being instantiated in the unobservable.

As previously stated, a fundamental premise of the scientific view of music is that the ontological status of music itself is instantiated in brain processes (and realized in the form of music cognition). As has been stated earlier, the general hypothesis on which CTM operates is that the manifest view of music supervenes upon the scientific view. According to the models of music cognition which I am examining in this study, the appearance value of the manifest view of music is proposed to be properly and fully expressed within the terms of a naturalized form of the APV.

As with the other models, the scientific view and the APV will be challenged on two counts: first, on the basis of my claim that the APV owes its justification to a specific cultural situation and therefore is itself historically and culturally instantiated; and second, on my claim that the scientific view of music is grounded (and relies for an explanation) in the terms and categories of the manifest view.

8.2 Philosophical underpinnings of the model

8.2.1 The innateness hypothesis

It is important to establish at the outset the fact that Fiske aligns himself with two major figures in cognitive science literature, Jerry Fodor and Noam Chomsky, who promote the notion that the human mind possesses a genetic menu which predetermines its conceptual organization and predetermines the manner in which it accepts and relates to sensory stimuli. Fodor expresses the scientific supervenience hypothesis when he states that "our innate endowment determines which worlds we can, in principle, understand" (Fodor, 1981: p. 314) and in his claim that the human brain is predisposed to acquire certain (limited) concepts. Fiske also refers to Chomsky's claim that our experience of the world is conditioned by our brain design. Chomsky states that mental structures are "predetermined by the biologically given organization of the mind" and states that mental structures such as concepts "are not learned, but are part of the system that makes learning possible" (Chomsky, 1975: pp. 72 and 91). Chomsky states that he rejects "the concept of the 'empty organism,' plastic and unstructured (Chomsky, 1975: p. 132). Fiske states that Chomsky understands the mind as being "programmed genetically to accept and relate sensory information in certain specifiable ways" (Fiske, 1990: p. viii).

8.2.2 The APV basis for the model

There is plenty of evidence in Fiske's 1990 book, *Music and Mind*, to situate the author as a promoter of an APV-based musical ontology. The first hint of this is when Fiske states that "musical patterns are auditory-information bound" (Fiske, 1990: p. ix). By this, Fiske means that the term 'musical' refers only to elements within the auditory-cognitive domain, which, as will be explained, are realized in the form of tonal-rhythmic patterns.

Fiske reinforces his espousal of the APV when he states unequivocally that "musical unity is limited to the comparison of patterns that are perceivable aurally, and that emanate from the structure of an (aural) music language" (Fiske, 1990: p. x, Fiske's parenthesis). In other words, if information concerning the construction of musical patterns was realized from a *non-auditory* cognition network, Fiske insists that "any connection between the structure imposed by the foreign system and realized tonal-rhythmic patterns can only be made *artificially*, and only after the 'musical' tonal-rhythmic structure has been realized" (Fiske, 1990: p. 51). Therefore, the music cognition apparatus is deemed to grant temporal precedence to auditory pattern realization (i.e., specifically 'musical' cognition must take place prior to any 'non-auditory' cognitive processing accompanying the so-called 'musical' event).

More importantly, in the 'rule management systems' model, the music cognition is deemed to be mandatory and thus would very likely misrepresent patterns using 'non-auditory' networks (even if said networks could provide a 'proper' realization, which they can't) which he states is "owing to its incapability to do otherwise" (Fiske, 1990: p. 50). Concerning the above point, Fiske pays considerable allegiance to Fodor's modularity thesis. I shall go into considerable detail in the next section concerning the parallels between Fodor's modularity thesis and the 'rule management systems' model. However, it is important to realize for now that Fiske cannot convincingly advance the notion of a Fodorian-type 'music module' without first adopting the precept that the term 'musical' be defined within an APV-based musical ontology.

8.3 Pre-theoretical premises (axioms) of the model

Maintaining a strict cognitivist stance, Fiske defines music cognition as that which is "limited to the construction of tonal-rhythmic patterns from acoustical information, events, and the comparison of this pattern against previously presented patterns and new incoming events" (Fiske, 1990: p. 26). Fiske states that the design for his model involves three intended tasks: "(1) identify some descriptors of music decision-making activity; (2) show that this descriptor set has universal application; and, (3) demonstrate the significance of this for a theory of music aesthetics" (Fiske, 1990: p. vii). The first two tasks are concerned with the development of a description of the theoretical model. The third task sets two agendas: first, to establish the scientific view of music as logically prior to the manifest view; and second, to provide a 'naturalized' explanation for the APV.

Six pre-theoretical axioms form Fiske's theoretical framework. Axiom 1 states that "music cognition is unique to human brains" (Fiske, 1990: p. vii). Fiske further explains that "music exists only to the extent that there is a human mind available that is willing and able to construct and interrelate tonal-rhythmic patterns" (Fiske, 1993: p. 1). Axiom 1 stands on Fodor's (1981) suggestion that the human brain is genetically predisposed to acquire and employ certain conceptualizations which enable humans to order and structure their environment in the manner that they do. As mentioned earlier, this position is also proposed by Chomsky (1975), who claims that humans interpret their experiences and deal with the world in the way they do because of innate and biologically bounded (causal) mental capacities.

In terms of music, Fiske argues that humans respond to music *as music* because they are genetically endowed to do so, and that non-human organisms have the capacity to respond to music only physically (i.e., not cognitively). For non-humans (e.g., cats), music is deemed as simply one undifferentiated part of the whole auditory environment. Fiske claims that humans find order, structure and intention in musical sound because "assumed intentions and expectations imply specific cognitive processing for realizing musical content and for fulfilling the musical process from sender to receiver" (Fiske, 1990: p. viii).

Axiom 2 states that the function of music cognition is for the "identification [construction and realization] of patterns [and] is limited to tonal and rhythmic relationships (Fiske, 1990: p. ix). Fiske offers a corollary to this, stating that "music cognition is limited to the identification [construction and realization] of tonal/rhythmic patterns" (Fiske, 1990: p. 50).¹

Axiom 3 states that "music cognition requires time and effort" (Fiske, 1990: p. xi). Fiske explains that variances in the listening ability of listeners is due to concomitant variances in the "level of accomplishment in discerning relevant musical patterns, in detecting and recognizing discrepancies between these patterns, and in recognizing the function of these discrepancies as they concern pattern development and stylistic identity" (Fiske, 1990: p. xi).

Axiom 4 states that "music pattern comparison procedures represent a semantically closed (self-reference), metalanguage system" (Fiske, 1990: 16). Fiske further explains that "realized tonal-rhythmic pattern interrelationships determine musical/aesthetic meaning" (Fiske, 1993: p. 1).²

Axiom 5 states that "the pattern comparison component of music cognition is a multistage hierarchy" (Fiske, 1990: p. 42).³

^{1.} The reader should note that Axiom 2 is in keeping with the conditions imposed by the APV. I shall have more to say concerning that later.

^{2.} I shall elaborate on this issue in Section 8.4.1.

^{3.} This axiom is generated from a description of the structure of the decision-making process of pattern comparison, as will be outlined in a later section.

Axiom 6 states that "musical meaning is the set of realized (i.e., constructed by the listener) tonal-rhythmic relationships resulting from the relative success in penetrating the musicdecision hierarchy; depth (profoundness, richness, etc.) of meaning is dependent upon the extent of hierarchy penetration" (Fiske, 1990: pp. 85-86). This axiom provides the listener with what Fiske thinks of as a type of musical "window to the world," in terms of the success of the so-called "music communication" process (defined as the quantity and quality of the transmission of tonal-rhythmic pattern relationships) from composer to performer to listener. Fiske explains that "together they represent the purpose of Music in its widest intellectual, aesthetic, and cultural function" (Fiske, 1990: p. 86).

8.4 Description of the model

Before embarking on a description of the 'rule management systems' model, I shall reiterate two general hypotheses: first, that music is deemed to be a 'metalanguage'; and second, that the act of listening to music (and, by extension, the act of music cognition) is deemed to be a decision-making process consisting of the detection of relationships between tonal-rhythmic patterns. The reader should note that the purpose of this section is in effect to describe the processing structure in terms of the second hypothesis.

Essentially, the process of pattern decision-making boils down to an analysis of three types of pattern relationships: first, that P < ---> P (the given pattern P compared to an identical pattern P); second, that P < ---> P' (the given pattern P compared to a similar pattern P'); and third, that P < ---> Pn (the given pattern P compared to a distinctly different pattern Pn). Fiske categorizes the first relation as an *analytic* proposition and the second and third as *synthetic* propositions. To explain the distinction, Fiske states that

the truth-value of all three can only be known *a posteriori* where, for a particular music listening situation, given patterns are matched against comparison patterns. A decision is then made that results in finding one of the three propositions true and the remaining two false. This decision process is a primary function of music cognition. It seems likely that the realization of all forms of musical content relies upon this process. (Fiske, 1990: p. 23)

Fiske summarizes the 'descriptors' of the music cognition patternconstruction process as follows:

[Descriptor #] 1. Music cognition requires time and effort.
[Descriptor #] 2. A music decision is the result of no less than two specific processing stages.
[Descriptor #] 3. Prior to making a decision, a realized pattern must be made to conciliate with a given pattern P.
[Descriptor #] 4. Pattern comparison activity consists of a finite series of hierarchically sequenced processing tasks. (Fiske, 1990: pp. 40-41)

According to Fiske, Descriptor #1 evolved from a series of empirical studies (see Fiske, 1987) measuring the response time for pattern comparison using a wide range of variables. Fiske concludes that music cognition is a product of activities which include a temporal variable: that is, the time it takes to construct a pattern from a passage is dependent upon a combination of the listening skill level of the subject and the complexity of the musical passage. Thus, the time it takes to respond (in a test situation) to pattern identification is deemed to be empirical verification that cognitive processing decisions are in fact occurring. Concerning Descriptor #2, Fiske suggests that the identification of variables and the subsequent identification of their role in processing activity is more relevant to understanding music cognition than establishing (or describing) the number and order of processing stages. *Descriptor* #3 has to do with establishing a comparison pattern (i.e., the given pattern). This actually represents the first stage in the model. In explaining *Descriptor* #4, Fiske states that "music cognition consists of a series of independent processing stages rather than a single stage...multiple processing levels...depend[ent] upon the complexity of the given terminal task, the listener's ability to penetrate the task hierarchy, or the extent to which a listener can cognitively penetrate the hierarchy" (Fiske, 1990: p. 41).

8.4.1 Music as (meta)language

The title of Chapter 1 of *Music and Mind* is presented in the form of the question, "Is Music a (Meta)Language?" (Fiske, 1990: p. 1). Fiske stakes out his APV-based philosophical position when he states that "it is abundantly clear that music, if it communicates anything at all, does not communicate denotative messages" and, as a means of communicating messages,

he states that he "could not include music among my list of communicative options" (Fiske, 1990: p. 2).⁴ Fiske approaches the notion of musical reference more narrowly than traditional formalist aesthetic theorists who understand music in terms of its (assumed) power to be a language symbolic of expression (à la Langer). On this account, Fiske rejects what he calls "rather vague suggestions that music is symbolic, expressing things which cannot be expressed otherwise, and that the understanding of what musical content is can only be realized through experiencing music itself, an explanation that is nebulous, evasive, and extremely difficult to support" (Fiske, 1990: p. 2).⁵

In setting up a discussion as to the truth of the notion 'music as (meta)language,' Fiske reduces the problem to two tasks. His first task is to make a decision whether, and if so, to what extent is the cognitive processing of music like language processing. Fiske states that his second task is to determine "whether music has content and whether content is specifically communicated by music as it is in language" (Fiske, 1990: p. 1).

In referring to H/C's hypothesis of 'music as communication,' Fiske puts the issue of music and communication in the broader context of music cognition theory. Recall that H/C claim that music does not have 'denotative' but rather 'embodied' meaning. H/C make that claim in terms of Meyer's (1956) theory of expectational musical meaning; that is, in the sense that a given musical pattern (as a musical event) points to (rather than refers to) the occurrence of another music event. In Meyer's terms, so-called 'musical meaning' is embodied as a musical response (e.g., in the form of an emotion) that is aroused due to a suppressed expectation of a subsequent musical event. However, Fiske sees a contradiction and a consequent incompatibility of his with H/C's notion of 'embodiment.' He explains that "notions of 'embodiment' cannot be embodied in a theory which depends upon an interpretive factor and

^{4.} It is important to note that with this statement, Fiske is making a procedural error by premising his argument with his conclusions. I shall have more to say concerning that in my critical commentary.

^{5.} My intention is not to add to the extensive debate on this issue, but rather demonstrate the hyper-formalist path of Fiske's argument and in turn to tease out his theoretical agenda.

social/cultural contracts" (Fiske, 1990: p. 10).⁶ However, in terms of Fiske's view (and I tend to agree with him on this point), the problem is never clear with H/C whether the notion of 'embodiment' (i.e., 'embodied meaning') is embedded in the processing rules themselves or simply within relationships that persist between and among realized tonal-rhythmic patterns.

In order to set up the "music as (meta)language" argument, Fiske devises an exercise, assuming for the sake of argument that music is in fact a language. As stated above, Fiske's third and final intention (based on creating a descriptor list of music decision-making activity and on establishing the universality of said list) is to establish scientific proof of the truth of the APV (thus 'naturalizing' it).

In setting up the exercise, Fiske sets out six formal propositions. *Proposition 1* states that "a *musical language* (M1) consists of a set of tonal-rhythmic elements (E) (i.e., SUSS, the smallest units of sonic stuff -- e.g. one tone in Western music -- of a given musical language: M1{E1, E2, E3, E4...Ej, Ek, En})" (Fiske, 1990: p. 12, my italics).

Proposition 2 states that "concerning the *cognitive realization* of patterns, it can be shown that there are three, and only three categories of patterns which can be derived from a potentially infinite combination of elements" (Fiske, 1990: p. 12, my italics). The first pattern P, is designated as the given (cognitive realization of the first-perceived) tonal-rhythmic pattern. The second category is designated as pattern P', which is cognitively realized as being a derivation of pattern P. The third category is designated as pattern Pn, which is cognitively realized as being distinctly different from the given pattern P. As Fiske stipulates, "once P is defined, all other combinations of Es (SUSS) reduce to either P' or Pn" (Fiske, 1990: p. 13).

Proposition 3 states that "by substitution [of combinations of Es], a musical language consists of three pattern types or pattern categories: M1 {P, P', Pn}" (Fiske, 1990: p. 13, my italics).

^{6.} I am not sure if I agree with this reasoning. Refer back to the chapter on H/C for my approach to a criticism of their interpretation of 'embodied' meaning.

Propositions 1, 2, and 3 are derived directly from *Axiom* 2 (i.e., the identification of musical patterns is limited to tonal and rhythmic relationships). For Fiske, a musical language must have two components: first, sets of stimuli in the acoustic domain; and second, the perceptions of those stimuli (leading to cognitive realizations) as patterns, restricted to the three choices of pattern type.

Fiske formally designates the three pattern relationships as *Propositions* 4, 5, and 6: *Proposition* 4 states that "P <---> P, or 'the given pattern is identical to the comparison pattern' (where <---> = 'as compared with')"; *Proposition* 5 states that "P <--> P' or 'the given pattern is a derivation of the comparison pattern'"; and *Proposition* 6 states that "P <--> Pn or 'the given pattern is distinctly different from the comparison pattern" (Fiske, 1990: p. 14).

Fiske stipulates that the tonal-rhythmic relationships represented by *Propositions* 4, 5, and 6 are "not in themselves propositions...instead, the proposition is the semantic conclusion that the two patterns are structurally [related]. In this way, statements about pattern relationships are separated from the acts of perception" (Fiske, 1990: p. 15). Thus, the *cognitive realization* of pattern comparison (post perception) is said to arrive in the form of a proposition.⁷

In anticipation of the questions raised in the above footnote, Fiske proposes Axiom 4, the intention of which is to clarify the formal conditions under which a 'music (meta)language' operates. Axiom 4 states that "music pattern comparison procedures represent a semantically closed (self-reference), metalanguage system" (Fiske, 1990: p. 16). Finally, Fiske defines the 'music (meta)language' as a

language of syntax; it defines the surface structure rules setting the range for interelement and interpattern relationships...a metalanguage...[for] music is limited to syntactical descriptors...[and] limited to musical statements about other musical statements with extensions limited to coherent inter-composition and inter-stylistic comparisons" (Fiske, 1990: p. 16).

^{7.} This leaves the reader with two questions: first, the reader requires an explanation of how the step from perception to cognition of inter-pattern relationships becomes *semantically* propositional; and second, the reader needs to know how musical pattern comparison conclusions come to have semanticity. I shall discuss Fiske's version of the notion of 'semanticity' shortly.

In his 1993 book, *Music Cognition and Aesthetic Attitudes*, Fiske elaborates on his earlier description of tonal-rhythmic (T-R) patterns (which constitute the essential elements of the 'music metalanguage'). He states that

(T-R) patterns are portrayed by the theory as syntactic-ordered expressions that are nondenotative and nonintentional (i.e., unlike beliefs or desires, T-R patterns are not tokens directed towards physical objects). As such, musical T-R patterns can only be about other musical T-R patterns; the metalanguage theory shows why musical patterns, unlike speech T-R patterns, cannot be about persons, objects, or events that lie outside of pure tonal-rhythmic activity. Unless you are a Referentialist you have known this all along. (Fiske, 1993: p. 114)

I hope to demonstrate later in the chapter that in naturalizing music cognition under the guise of the APV, Fiske is in fact naturalizing the APV itself. Thus, if one were to adopt a 'referentialist' philosophical position concerning music cognition, Fiske would argue that one would be in an illusory state. This is because the mental apparatus for music cognition is deemed to operate solely within the auditory-cognitive domain specifically because of its deemed natural adherence to an APV-based musical ontology.

Fiske cautions that the 'music metalanguage' is not to be interpreted reductively in terms of brain machine-language. He states that "brain machine-language serves as the control for music processing, but the metalanguage framework for such processing is not brain-machine language, but rather the set of rules governing the style and character of music decision-making activity" (Fiske, 1990: p. 17). I take the above statement to be a strong implication that the processing rules of the 'music metalanguage' operate as a modular set along the lines of Fodorian modularity. When Fiske states that "the structural framework of music decision-making is the same for *any* music language" (Fiske, 1990: p. 17, Fiske's italics), I understand him to mean that the 'music metalanguage' is not only modular but is also implicit, and universal to *all* musical idioms.

The reference to brain machine-language fits well with Fodor's (1983) 'Central Systems' component in his cognitive (modular) model, which stores representations generated by the 'Input System' modules. In terms of Fodor's model, the processing procedures of each vertical

module in the Input Systems is said to be informationally encapsulated, and by extension, is said to operate in terms of its own set of processing rules (i.e., its own 'metalanguage'). Fodor proposes the existence of separate 'vertical modules' in the Input Systems for such capacities as vision, audition, mathematics and language, each of which is said to be neurologically hardwired, computational, involuntary and mandatory. The operation of each 'vertical module' is, by definition, independent from the others, both in terms of the kind of processing rules it possesses and the type of representations it generates.

As the Fodorian story goes, the so-called 'horizontal modules' are situated in the 'Central Systems' component. Being 'domain neutral' and 'informationally unencapsulated,' the 'horizontal modules' permit the interaction of representations generated by the various 'vertical modules.' Fiske claims (on behalf of Fodor) that the 'horizontal modules' are "at least partly subject to introspection", whereas the 'vertical modules' are "cognitively impenetrable." (Fiske, 1990: p. 20). The limits of this study do not permit a detailed discussion of Fodor's modularity thesis, but it is important to note that Fodor does suggest that music has its own 'vertical module.' In support of Fodor's suggestion, Fiske states that "music cognition is understood to be an encapsulated, domain specific enterprise limited to processing tonal-rhythmic information. Such information is impervious to introspection" (Fiske, 1990: p. 20).

It must be noted that before Fiske can approach a description of the 'music metalanguage,' he must first embrace the APV as a basis for discussion. To this end, Fiske states that "by accepting this idea [that the music metalanguage represents a vertical module], one accepts musical reasoning is unique and not dependent upon or influenced by other forms of reasoning and problem solving" (Fiske, 1990: p. 20). In forestalling any conflicting ideas that music has referential powers (or that music cognition involves an interaction with other modes of reasoning), Fiske emphasizes the formalistic bias in the APV-based claim that "musical patterns are 'about' other musical patterns. They are not about mathematical reasoning or linguistic reasoning, and they do not share the cognitive processes involved in non-musical forms of reasoning" (Fiske, 1990: p. 20).
In light of the above, the question nevertheless remains whether Fiske would further claim that musical meaning (being, by definition, self-referential at the Input Systems level) is also self-referential at the Central Systems level, the theoretical seat of intentional states. If Fiske does indeed (and I shall demonstrate that he does) extend the concepts of informational encapsulation and domain specificity (privy to the Input Systems) to the level of intentional states (as instantiated in the Central Systems), he is in fact making a faulty interpretation of the Fodorian model. That is because (as I interpret Fodor), informational encapsulation and domain specificity are not features of the Central Systems as defined. As I understand the modularity thesis, there is nothing to prevent so-called 'non-musical' information (at the Central Systems) resulting in a realized belief that a passage of music might actually refer to something outside the formal auditory-cognitive domain.

However, if I read Fiske correctly, he indeed implies that at the Central Systems level, belief about music (that so-called 'musical' meaning is formally self-referential) does remain informationally encapsulated and domain specific. On that count, I must then understand Fiske to be saying that the proposed "reality" of the formality conditions existing at the level of cognitive processing parallels a "reality" at the level of conscious realization (as projected from the Central Systems). The question then arises as to how Fiske would explain a person's belief, say, that a certain passage in music represents an image of a man on a galloping stallion. In terms of the APV, this type of relationship can only be interpreted as artificial. However, upon reviewing the statements made by Fiske (quoted at the beginning of this section), I am led to believe that Fiske is in fact justifying his APV-based position in terms of a theoretical design that is founded on the argument that the scientific image of music (i.e., the unobservable cognitive processes) is logically prior to (and therefore explanatory of) the manifest image of music, deeming all so-called 'extra-musical' reference to be artificial. It is on this point that I part company with Fiske. I shall discuss this issue further in a later section of this chapter.

8.4.2 A theory of aesthetic attitudes

Assuming Fiske's postulation is true that music is a self-referential (symbolic) system (i.e., a music metalanguage), the question arises as to how (under the guise of a music metalanguage theory) he would explain the notion of affective response to music without having to resort to a referentialistic answer. Recall that (within the laws of the music metalanguage) listeners respond to music on the basis of its formal features, that is, in terms of an interpretation of tonal-rhythmic patterns. Also recall that the musical (i.e., formal) interpretation of a given pattern structure (i.e., P, P', or Pn decisions) varies among listeners depending upon which stage the listener exits the decision-making hierarchy.

Fiske admits that a possible additional result of a musical (formal) interpretation of a pattern comparison may come to the listener in the form of an emotional response. Fiske's short answer to that possibility is that affective responses have what he calls 'appearance-value' (hereafter AV) and therefore, by definition, have 'nonmusical' status in his musical cognitive economy. Fiske states that in addition to the P, P', Pn decision, a listener may experience a socalled "non-musical response (such as an emotion) that takes on an appearance value (the music 'resembles/is like/reminds me of feelings of longing' or whatever)" Fiske, 1993: p. 116). In further explanation, Fiske restates his earlier claim from Music and Mind that affective responses "follow actual music cognitive activity and occur as a response to realized pattern relationships rather than existing as realized content inherent within T-R patterns themselves" (Fiske, 1993: p. 115, Fiske's italics). It would appear from the above quote that Fiske's intention is not only to segregate the notions of "musical meaning' and 'affective response' but also to exclude 'affective response' (since he claims that affective response follows cognitive activity) from elemental status in musical cognitive processing. However, Fiske does segregate mental activity into two categories: first, that which is 'covert' (i.e., inaccessible to the listener); and second, that which is 'overt' (i.e., evident to the listener).⁸ However, Fiske does state that the

^{8.} Fiske is careful to avoid the terms 'conscious' and 'unconscious.' This avoidance is one of the keys to my critique of the model, because, as I shall demonstrate, it points to the difficulty the model has in reconciling the scientific image with the manifest image of

processing occurring in the decision task hierarchy is in fact 'covert' activity and that the "sensation of sound, the recognition of a musical pattern (pattern, form, etc.), and the felt non-tonal-rhythmic content (e.g., 'longing') that we interpret as appearance-value are all overt activities and experiences" (Fiske, 1993: p. 116). However, it is interesting that Fiske refrains from referring to such 'overt' activity as "music cognition."

For help in explaining the causal source of musical affective response, Fiske takes out a loan from Fodor's (see 1987 and 1990) theory of propositional attitudes (hereafter PA's). Fiske states that

if it is true that propositional attitudes serve as causal connectors between physical/neural symbols of belief/desire states and semantically evaluable linguistic tokens, then aesthetic attitudes serve as causal connectors between mental symbols of musical thinking and nonsemantically evaluable musical tokens. For music, nonsemantically evaluable attitudes translate to tokens having appearance-value (rather than semantically evaluable truth-value, as is the case for linguistic tokens). So, appearance-value is the listener's (personal) articulated belief about the perceived musical event. (Fiske, 1993: p. 115)

Thus, the so-called 'aesthetic attitudes' (hereafter AAs) are deemed to be causally instantiated (as are the Fodorian PAs). The difference between the two types of attitudes is that rather than translating into an actual belief/desire set (as per the PAs), the AAs have only appearance-value and come to overt status in the form of *personally* articulated beliefs.⁹

Before proceeding with an explanation of Fiske's four (actually five) "principles of aesthetic attitudes," I would like to supply a working definition of the term 'propositional attitude' (PA). Briefly, PAs comprise notions such as belief, desire, intention, hope, fear, wish, etc. As Guttenplan states, "what links these attitudes is the fact that they are identified by their propositional contents: a belief that snow is white is identified by the proposition that snow is white. Since propositional contents are attributed in English by 'that'-clauses, two people's beliefs, say, are counted as different if they are correctly identified by non-equivalent 'that'-

music.

^{9.} One question that arises is whether Fiske is implying (by speaking of AAs in terms of 'personal articulated belief') that there is some sort of 'private language' of affective response. I shall have more to comment on that in my critical remarks in Section 8.5.4.

clauses" (Guttenplan, 1994: p. 488). The interesting project for philosophers and cognitive scientists is (1) to explain how attitudes identified by content are related to physical (brain) states; (2) to show whether or not so-called propositional states can cause behaviour, given that one might normally accept that brain states cause physical movement; and (3) explain how, if at all, do PAs figure in a full explanation of a scientific psychology.

Some philosophers have attempted to answer the first question (i.e., how states identified by content are related to physical states) by naturalizing the PAs. In that respect, Jerry Fodor's answer to the question is his postulation of a so-called 'language of thought.' Guttenplan defines 'language of thought' as "a language-like representational system (or systems) for encoding and utilizing information in the mind" (Guttenplan, 1994: p. 172.) Guttenplan demonstrates how confusing Fodor's proposed 'language of thought' is. He states that

the general idea is that a symbol in the language of thought - say, 'C' - expresses the property of being a cow if and only if (i) it is a law that cows cause tokens of 'C', (ii) some tokens of 'C' are caused by non-cows (horses, say); and (iii) if cows did not cause 'C's, then neither would non-cows; but cows would still cause 'C's even if non-cows did not cause 'C's. (Guttenplan, 1994: pp. 489-490)

The idea of a 'language of thought' has generated considerable debate among philosophers and cognitive scientists concerning how can such cognitively inaccessible (and physically instantiated) syntactical symbols become semantically evaluable. Concerning reductive accounts of the PA's such as Fodor's, Guttenplan states that "none of these reductive accounts of the [propositional] attitudes has found full acceptance. Many philosophers simply assume that the attitudes supervene on some physical states or other, whether or not anybody can specify any supervenience base for any propositional attitude, and move on to other issues" (Guttenplan, 1994: p. 490).¹⁰ Although issues surrounding the notion, 'language of thought' *per se* is not a topic for detailed discussion in this study, suffice it to say for now that

^{10.} See Section 8.5.4 for my critique of Fiske's adaptation of the Fodorian notion of a language of thought.'

Fiske models his 'music metalanguage' and his theory of AAs on Fodor's postulations. Let us return to the task of outlining Fiske's model as it relates to the AAs.

Outlined below is a list of Fiske's four (actually five) 'Principles of Aesthetic Attitudes.' I shall flesh out each one in turn. *Principle 1* states that "*a pattern construct is the mental representation of a T-R token*" (Fiske, 1993: p. 117). This originates with Fiske's statement that "T-R patterns [e.g., melodies or melodic fragments] are created by quantifying [at the computational level] across SUSS [i.e., smallest units of sonic stuff] symbols" (Fiske, 1993: p. 117) and remain within the confines of a culture-specific musical language (i.e., musical idiom). Fiske defines 'musical language' as "the collection of elements (E) accepted by a community as constituting proper musical material" (Fiske, 1993: p. 117). The pattern construct (i.e., the melody or melodic fragment) is deemed to be a representation of a particular combination of SUSSs. Fiske states that "Es function as computational units across other Es while remaining neutral to any meaning" (Fiske, 1993: p. 118). T-R pattern constructs (as combinations of Es) function as representations to be used as models for comparisons to other newly-constructed T-R patterns within the constraints of the music metalanguage.

Principle 2 states that "an aesthetic attitude is a nonreducible psychological state caused by the decision-product of a pattern comparison token" (Fiske, 1993: p. 118). Recall that Fodor's theory of PAs requires three components: first, a belief (e.g., that the cat is on the mat) held as a neural state in the belief compartment of the brain; second, a PA (e.g., a psychological token caused by the so-called neural state formulated as a realization that the cat is on the mat); and third, a proposition (e.g., a statement that the cat is on the mat).

Fiske claims that for music, there is no need for PAs because musical psychological states are not deemed to be contentful in the way that belief/desire states are. By Fiske's definition, a so-called 'decision-product' of the musical decision-making hierarchy is an outcome of cognitive processing (resulting in Ps, P's, or Pns) and as such, has no denotative content. Thus, Fiske differentiates the psychological states caused by musical T-R constructs as 'aesthetic attitudes.' Therefore, Fiske maintains that tokens (i.e., decision-products) of musical

decision-types (like belief/desire tokens) have causal properties. Based on the above, Fiske concludes that the sort of psychological states caused by tokens of decision-types are "attitude states of some kind" (Fiske, 1993: p. 121).¹¹

Principle 2a of the AAs, expressed as a corollary to Principle 2 states that "X attitude state is a psychological state, a token of which is a decision-type attitude having (individual listener-selected) P, P', or Pn content" (Fiske, 1993: p. 121). First, Fiske stipulates that the relation, P/P'/Pn "is an aesthetic (to be used as a noun...) and further stipulate[s] that P/P'/Pn attitude state is an aesthetic attitude state" (Fiske, 1993: p. 121, Fiske's parenthesis and italics).¹² Next, Fiske explains how the listener acquires the so-called X attitude state. To this end, he goes back to the hierarchical decision-making process, which a listener exits upon coming to a P/P'/Pn decision about a T-R pattern. Fiske stipulates that the listener's selection of the exit step from the decision-making hierarchy could be either voluntary or involuntary "due to interest, listening capability or whatever" (Fiske, 1993: p. 122).¹³

12. I shall eventually put a finer point on Fiske's label and call it a *natural aesthetic attitude* state. For now, I am just concerned with the line he is drawing between PA and AA states.

^{11.} Fiske says he wants to make clear that a decision type "is not the same as a *belief* or a desire about the relationship between patterns P and K. Rather, it is merely the result of a computation across E-level SUSS material" (Fiske, 1993: footnote 7, p. 134). My feeling is that at the computational level there really is not much to distinguish between beliefs, desires and musical decision-types because we are only discussing the processes of syntactic symbol comparison. If I read Fodor correctly, such things as beliefs, desires, etc., at the computational level have no content either (or at the most, 'narrow' content, from not having been exposed or tried out in the world). 'Narrow' content is construed as arising from the relational situation between or among computational symbols. The 'narrow' content equivalent in music should be limited to P/P'/Pn statements. In my view, Fiske does not convince the reader why a belief (in terms of 'broad' content) about the relationship between two pattern tokens P and K could not come in the form of a proposition emanating from a PA (e.g., a statement of a belief that melody P is more exciting than melody K because melody P has a greater intervallic compass than melody K). As we continue, let us see if Fiske provides substantive reasons for hypothesizing a separate class of AAs, distinguished from the PAs.

^{13.} I claim that the exit step can only be *involuntary* because the decision-making hierarchy is defined as 'cognitively inaccessible.' On that basis, the listener cannot possibly have an active part in decisions of exiting the hierarchy—the decision-making mechanism simply exits the hierarchy. This point may prove to be pivotal in

In order to carve out the differences between PAs and AAs, Fiske sets out to prove that a token of a musical decision-type cannot be put to a test of *semantic evaluability* (as with a proposition). The Fodorian PA story says that the truth or falsity of a proposition (e.g., that today is Thursday) can be tested for semantic evaluability (by checking to see if today is in fact Thursday). That is, if I say today is Thursday and if in fact it turns out to be Thursday, then the statement is true and if not, then false. Fiske claims that the same demands cannot be made on musical T-R pattern-comparison decision-types. He states that "if L1 hears the patterns as being identical (as a result of negotiating a number of levels of the task hierarchy), and L2 hears them as being different (as a result...etc.), then we cannot say that one of the listeners is stating something that is false" (Fiske, 1993: p. 123). Fiske also claims that

both listeners are correct in respect to what they heard and the extent to which they successfully processed what they heard via the task hierarchy. In short, pattern decision-types are not semantically evaluable. Therefore, decision-types are not propositions. Therefore, decision-types are aesthetics. Therefore, for L1 to hold a particular decision-type following a P-K comparison puts L1 in an aesthetic attitude psychological state and not a propositional attitude state. (Fiske, 1993: p. 123)

Thus, Fiske concludes that the reason that an AA is not a PA is because

decision-type tokens (P/P'/Pn) are the content of aesthetic attitudes. P/P'/Pn decision-type tokens are not propositions or propositional content of propositional attitudes; instead, P/P'/Pn are aesthetics (noun form). Nor do aesthetic attitudes reduce to propositions. (Fiske, 1993: pp. 125-126).

On the basis of the above, Fiske maintains that all listeners are always correct in both

their P/P'/Pn decisions and also in terms of the affective responses caused by those decisions.

That is because the content of such decisions is purely syntactic. It is on this point that we find

a parallel argument with Fodor's, that at the computational level, 'syntax parallels semantics.'14

Principle 3 of the AAs states that "aesthetic attitude tokens (parallel to propositional attitude tokens) are construed as relations to pattern construct symbols; just as a token proposition is the articulation of the content of a propositional attitude (e.g., belief or desire), a token aesthetic is the

pointing to certain inconsistencies in Fiske's model.

^{14.} See my comments on this issue in Section 8.5.4.b.

articulation of the content of an aesthetic attitude (e.g., P, P', or Pn)." (Fiske, 1993: p. 126)¹⁵ This requires some explanation. Fiske maintains that a T-R pattern construct has the capacity to cause an AA and that an aesthetic token describes the content of an AA. The content of an AA (found in an aesthetic token) is about T-R pattern relationships, expressed as P/P'/Pn. Fiske specifies that "an aesthetic token is about the current state of an aesthetic attitude and *not a property* of a pair of pattern constructs, say P and K. (This is the principal reason that theories assuming a simple and direct T-R pattern-AV bond don't work.)" (Fiske, 1993: p. 126, Fiske's italics and parenthesis).

By insisting that an aesthetic token is the content of an AA and not a property of P or K, Fiske is then able to maintain the formalism that he claims exists throughout the cognitive chain, starting with SUSS-symbol neural states, then to the AAs, and then to pattern constructs with AA content, articulated as P/P'/Pn. Fiske concludes that "despite the causal properties of pattern constructs via SUSS-symbol quantification, aesthetic attitude (psychological) states exist independently of neural states" (Fiske, 1993: p. 126). Actually, Fiske maintains that AA states are not reducible to neural states. In point of fact, everything discussed so far (up to and including *Principle 3*) has been a description of covert activity. By being covert, this activity carries with it two features: first, it is cognitively inaccessible; and second, it is mandatory and involuntary. The AAs (and their creation and subsequent description of their contents) are said to arrive on the cognitive scene as a direct and involuntary result of a mechanistic set of computational processes. Active (i.e., overt) listener participation in the processes is not a factor up to this point, although Fiske says that the listener is aware of the *results* of the realized decision-type.

Principle 4 of the AAs states that "appearance-value (AV) is the nonsemantic evaluation of an overt response to the decision-type product of P-K comparison tokens" (Fiske, 1993: p. 134). A more detailed look at Fiske's use of the terms 'overt' and 'covert' is in order. Primarily, the listener is said to be aware of and can describe 'overt' activity. Fiske states that he uses the terms 'overt' and 'covert' "simply because I don't like the words 'unconscious' and 'conscious'

^{15.} Note that Fiske refers to an aesthetic token as an aesthetic (noun form).

since (1) they have caused *so* much confusion ever since Freud, and Freud is no longer *au courant* anyway, and (2) other words such as 'impervious to introspection' take up so much space. O.K?" (Fiske, 1993: p. 134, footnote 10, Fiske's italics).¹⁶ That having been said, the activities occurring within the framework of Principle 4 are deemed to be 'overt' and the listener is said to be both aware of them and can also describe them.

Fiske defines 'appearance-value' (AV) as a listener-felt response caused by an aesthetic (i.e., decision-type). Fiske differentiates his concept of "felt response" from others by refusing to permit a bond between the T-R pattern and the AV. That is, the AV is not deemed to be a *property of* but rather is *caused by* the aesthetic. Fiske (and perhaps rightly so) does not wish to permit a situation in which the so-called "felt response" is inherent in the auditory signal itself. In other words, he does not want to say (and again perhaps rightly so) that the auditory signal is symbolic of (therefore reducible to, and causal of) a content (i.e., a felt response). This is all because of his stipulation that "T-R patterns are content and causal-property neutral" (Fiske, 1993: p. 127).¹⁷

Fiske specifies five ontological criteria for appearance-value (AV). These are:

1. AV is caused by a specific decision-type aesthetic that satisfies the conditions of an aesthetic attitude.

2. AV is a nonreducible psychological property (i.e., nonreducible to aesthetic states, etc). This property has the following form: decision-type D evokes an X-caused affective experience A, where D is the usual P/P'/Pn trichotomy, X is some life experience or event, and A is a particular affective experience --longing, joy, sadness, etc., etc., etc. Affective experience A takes on AV as described by the following criteria.

3. AV is linked to the affective response of an aesthetic attitude state: AV therefore has no truth-value. An X-caused affective experience A, evoked by a listener-realized decision-type D, can be neither true nor false contingently; there are no contextually specifiable environmental objects that establish truth-value conditions for AV responses to music.

^{16.} I shall elaborate on Fiske's apparent deliberate lack of clarity in Section 8.5.4.c.

^{17.} In fact, Fiske insists that the proper focus of research should be on the "listener's own nonreducible aesthetic attitudes caused by varying success in negotiating the decision-task hierarchy" (Fiske, 1993: p. 127).

4. As an independent (i.e., nonreducible) property, AV may interact freely with other mental states (beliefs, desires, experiences, and *their* affective content), but is done so at the whim of the individual listener. This interaction is therefore nontruth-preserving and unpredictable.

5. AV may or may not occur as a result of encountering and processing a particular musical event or as a result of repeated encounters with that event (owing to variable listening conditions, variable listener dispositions, etc.). (Fiske, 1993: p. 127)¹⁸

This completes my overview of the 'rule management systems' model. The next section comprises a detailed critical analysis of issues that have arisen in the presentation of the model. Fiske's model of music cognition is perhaps the most explicit cognitivist theory thus far examined. My general task, in the next section, will be to unpack the difficulties with the model specifically with a view to my own two-fold project of relating the APV to the manifest/scientific image supervenience issue in CTM.

8.5 Critical commentary

8.5.1 Naturalizing the aesthetic attitudes

8.5.1.a Opening remarks

To begin, let it be said that there is a similar problem in Fiske's proposal for the naturalization of the AAs as with Fodor's postulation of a 'language of thought.' I contend that in proposing the AAs to be the 'causal connectors' between sound objects (i.e., nonsemantically evaluable musical tokens) and T-R patterns (i.e., mental symbols of musical thinking), Fiske is making the same error as Fodor does. If the argument against Fodor is that the PAs, being supervenient upon as he says, "some physical state or other," leads to an infinite regress, the argument is not going to be much different in terms of Fiske's claim that the AAs have causal properties. By postulating such a claim, Fiske then puts himself in the unattractive position of having to explain the causal story for the decision-making hierarchy, and so on down the line. In any case, even if he could provide an explanation, it gets less and less interesting because it

^{18.} Refer to Section 8.5.4.d for critical commentary on the above.

becomes more and more remote from the manifest image of music. The more atomic the explanation becomes, the less interesting it is for a theory of music (manifestly conceived). There will be a point in the chain of regression at which the reader will look up and ask, "What does all this theorizing have to do with music?"

There is another equally troublesome problem with Fiske's appropriation of the term 'aesthetic attitude' in terms of its being a natural phenomenon. I claim that Fiske and others who promote CTM, have adopted an what I call an "attitude to aesthetics" which I claim is not *causally*, but rather *culturally* instantiated. The historically accepted use of the term, 'aesthetic attitude' may be taken as an explanation of how a person relates to a piece of music as a work of art. Fiske's particularized use of the term emanates from a goal to provide a scientific explanation of the formal (and formalized) processes of music cognition. Thus, the term 'aesthetic attitude' in its new guise, refers to a causally instantiated mental entity. I claim that one may espouse a particular 'aesthetic attitude' (manifestly conceived) which may be more accurately thought of as an 'attitude to aesthetics.' In approaching the term this way, it has the advantage of treating an 'aesthetic attitude' as a definable stance (among many) from which to understand how music manifests itself in the world.¹⁹

Fiske criticizes cognitivist models (in particular, L/J's) that assume "that the dynamics of musical structure represent *at the same time* the dynamics of cognitive structure" (Fiske, 1990: p. iii). Fiske's theory actually falls into a similar trap. Fiske makes what I take to be an incorrect assumption that the dynamics of *cognitive processing* certifies (and in fact, naturalizes) the APV. I shall unpack my argument in the next few paragraphs.

First, a summary of Fiske's model would be articulated as: (a) the nature of the information provided to a cognitive processing network is the acoustic stimulus to the auditory sensory system provided by a musical instrument; (b) the cognitive processing network is structured as an informationally encapsulated music module equipped with processing rules

^{19.} From this point on in my commentary, I shall differentiate between my use of the term 'aesthetic attitude' by designating its specific scientific usage as AA.

which handle tonal-rhythmic information exclusively by engaging in a decision-making process involving the formulation and comparison of tonal-rhythmic patterns; (c) the processing outcomes are in the form of patterns and pattern comparisons summarized as P, P', or Pn decisions; and (d) the significance of (c) to the individual is musical interpretation, musical meaning and musical communication, based on a reading of a given pattern in terms of P, P', or Pn decisions. Thus, musical significance is framed within a cognitively inaccessible formal process. That which is said to be projected to the manifest level is, under the above conditions, instantiated as a natural process, conceived in the scientific image mode.

Recall that Fiske sets out three goals in *Music and Mind*. He states that his purpose in the book is to "(1) identify some descriptors of music decision-making activity; (2) show that this descriptor set has universal application; and, (3) demonstrate the significance of this for a theory of music aesthetics" (Fiske, 1990: p. vii). I claim that goal #2, the quest for the identification of universal cognitive processes, is the motivating force behind Fiske's model as well as others promoting a cognitivist hypothesis for music. Goal #3 is the reward for goal #2, because then Fiske's theory will have provided scientific proof for the authenticity, the legitimacy, and the naturalistic foundation for the AAs. Recall that in Fiske's theoretical economy, the manifest image of music supervenes upon the scientific image, and by extension, an explanation of the manifest image of music (in terms of the APV) is illuminated and legitimized by a scientific explanation of the cognitive processes and structures that are causal to manifest experience. That is, scientifically motivated explanations of music cognition explain away referentialist or expressionist aesthetic attitudes in music (manifestly conceived) as artificial or illusory.

The problem with the above is that the terms of scientific explanations of music must be founded in the terms and categories of the manifest image. Ultimately, in terms of discussions of aesthetics, the APV has no more legitimacy in the world than referentialist or expressionist attitudes. All three have a level of validity under certain conditions. The important point is that an espousal of any particular attitude to aesthetics pertains to a person's manifestly conceived image of a particular piece of music or musical activity at a given time. Any one (or some, or all) of the various aesthetic attitudes could be incorporated into different situations for different reasons. For instance, embracing the APV on occasion may be appropriate for the analysis of the structure of musical works. Adopting a referentialist aesthetic attitude on occasion may be appropriate for understanding the historical and cultural aspects of musical idioms. Espousing an expressionist aesthetic attitude on occasion may be appropriate for understanding the relation of the formal features of a work as being symbolic of human feeling. Each aesthetic attitude contains some measure of truth about a particular piece of music or musical activity without necessarily containing the whole truth.

As stated throughout this study, CTM is dependent upon an espousal of the APV on which to premise explanations of the structures and processes of music cognition. In other words, because of its formalist underpinnings, the APV makes a very good fit for CTM. By presupposing an ontology of music in which tonal-rhythmic patterns are stipulated as *musical* and conceptual, historical or cultural influences become stipulated as *nonmusical*. This permits the kind of reductions that are best served by a scientific image of music formulated in an APVbased view.

Thus, explanations of music cognition in terms of a scientific image are actually undertaken using the terms and categories of a particularized manifest image instantiated in the APV. In terms of the APV, we know that formal entities such as tones, rhythms, patterns, structures, etc. become the ontological objects for a particularized manifest image of music. In CTM, the step taken from an ontology based in formal musical entities (manifestly conceived) to an ontology of mental representations of such items (scientifically conceived) is seemingly made without much ado. However, if the situation were reversed, with the scientific image of music becoming supervenient upon the manifest image, then the self-limiting scope of CTM becomes obvious. For CTM to be accountable in terms of the manifest image, it will then have to account for the whole musical environment, of which the APV is but a small part.

8.5.1.b On Principle 2a: semantic evaluability

Recall that *Principle 2a* (expressed as a corollary to *Principle 2*) states that "X attitude state is a psychological state, a token of which is a decision-type attitude having (individual listener-selected) P, P', or Pn content" (Fiske, 1993: p. 121). My criticism stems from what I see as an error of logic instantiated in *Principle 2a* in terms of the claim that P/P'/Pn decisions are not semantically evaluable.²⁰ Let me unpack that criticism. Briefly, if as Fiske states, a match or mismatch can be made between the statement, "today is Thursday" and the truth of what day it actually is, then I do not see why a match or mismatch cannot be made between a P/P'/Pn decisions, there has to be a base level of evaluability (and whether it is "semantically" evaluable or not is not of importance to my point). That is, if L1 makes a decision made by L1 (that P = P) is in fact evaluable.

The reason why I make this claim is because I think Fiske is creating a line of distinction between the evaluability of linguistic decisions and the evaluability of musical decisions. As Fiske states, the exit point in the decision-making hierarchy for a "today is Thursday" decision can be no more or less a determining factor for semantic evaluability than the exit point for a P = P decision. According to Fiske, both decisions are right *for the perceiver* regardless of the truth or falsity of the situation. Let us accept that claim as correct for now. However, here is the problem. On one hand, Fiske states that a person's *belief* about a "today is Thursday" statement can be changed if it is tested to be false. On the other hand (see example 1 in Fiske, 1993, pp. 123-124), he states that L1 and L2 simply *hear* two pitches *as* either in tune or out of tune and testing cannot change what they hear. L1 smiles, *believing that* the two given pitches are in tune, while L2 frowns, *believing that* the two pitches are not in tune. My problem is with Fiske's claim that even checking the pitches with a frequency counter cannot change the way L1 and L2 hear the two pitches. Fiske answers the question, "Who is correct?" by stating that

^{20.} See Section 8.4.2 for discussion on that issue.

"they both are. L1 *hears* [the two pitches] as being in tune; L2 *hears* [the two pitches] as being out of tune. What L1 *hears* is 'true' for L1; what L2 *hears* is 'true' for L2" (Fiske, 1993: pp. 123-124, Fiske's italics). For argument's sake, let us accept that for now. However, the problem arises when Fiske concludes that the moral of the story is that "the human auditory system is the *final arbitrator* in intonation contests" (Fiske, 1993: p. 124, my italics). My concern with this centres around the inconsistency of why the calendar qualifies as the final arbitrator in "today is Thursday" contests and the mechanical pitch analyzer does not. Both the calendar and the pitch analyzer are external to the perceivers and both are set up as means to objective measurement.

Nevertheless, Fiske claims that looking at the frequency counter's gauge will not change a listener's belief about the tuning of two pitches. So, if a listener hears the two pitches as in tune, but sees on the frequency counter's gauge that the pitches are out of tune, Fiske claims that nothing can change his mind (i.e., his belief) as to what he hears. According to Fiske, the listener's *seeing as* "out of tune" cannot overcome his *hearing as* "in tune."

The problem is that I think Fiske is playing a bit of semantic gamesmanship here. First of all, I do not see any final difference between situations such as "hearing that such and such a pitch is in (or out) of tune," "seeing that such and such a pitch is in (or out) of tune," (with the use of a frequency analyzer), and ultimately "believing that such and such a pitch is in (or out) of tune." These are all subjective ways of judging. With these terms, it all comes down to belief. Fiske claims that the listener cannot believe a different story than that told to him by his ears, even if his eyes tell him otherwise. The question arises as to why hearing as takes precedence over seeing as in subjective modes of judgment. As far as the hearing as side goes, this argument can be traced back to the influences of the APV. Music, premised as a solely hearing as situation, is said to operate solely in terms of the auditory-cognitive domain. In an APV-based musical ontology, "hearing" is believing and "seeing" is 'nonmusical,' and therefore cannot be a party to the process of so-called 'musical' judgment.

Now, let us step back to our "today is Thursday" question. The question arises why Fiske singles out *hearing that* situations as semantically invaluable and yet permits *believing that* situations such as in the statement, "today is Thursday" to be semantically valuable. If I am in a state of belief that today is Thursday and it is in fact not Thursday, Fiske claims (as do I) that I can have that state altered simply by looking at the calendar to *see* what day it really is. On the other hand, Fiske claims that I *cannot* change my belief about the hearing of two pitches even though a frequency analyzer may indicate otherwise to my eyes. Fiske says that I just *hear* it that way and nothing can alter the way I hear the two pitches. The reason I suspect that Fiske makes this stipulation is because, *hearing as* (in terms of music) cannot be constitutive of belief because belief as a linguistic notion is said to be contentful. In point of fact, the formalism inherent in the APV itself precludes linguistic-style belief patterns entering the evaluation process.

The problem remains however, as how to reconcile the notions, *seeing as* and *hearing as*. On the basis of his own argument, Fiske would have to agree that for a deaf person, *seeing as* would be unalterable in terms of what his eyes told him, because the deaf person would by necessity be operating in a visual-cognitive mode. Without being able to hear the two pitches, a deaf person would inalterably have to *believe that* his *seeing* of the two pitches as different on the gauge was correct because he *saw* them as different. However, under Fiske's argument, since the deaf person would have to rely only upon his sight for judging the two pitches, he could never be convinced that what he saw was not true. I would argue that the deaf person would never be so sure that what he saw on the gauge was actually true, because a certain element of belief (or disbelief) would have to creep into the situation. In any case, for me, it all seems to come down to a case of *belief*, and we know, by definition, that belief states are semantically evaluable. Therefore, and on that basis, I am in disagreement with Fiske as to the semantic invaluability of *hearing as* situations. For me, *hearing as* situations are too easily mixed up with *believing as* situations for there not to exist a certain level of semantic evaluability.

The problem hinges on Fiske's insistence on reducing the answer to a strictly *hearing as* situation. It would seem that Fiske interprets an "in tune" type of decision as effectively a "music cognition" decision, that P = P. In terms of my broader conceptual framework for a

musical ontology, hearing two pitches in isolation and making a P = P decision would not necessarily have to be a "musical" decision *per se*, albeit that it would certainly qualify as an "auditory perception" decision. A "musical" decision involves a wider context than a simple auditory judgement of the comparative frequency of two isolated pitches. Nevertheless, I contend that a P = P decision carries with it an element of semantically expressed belief.

In his second example (given in order to prove the truth of *Principle 2a*), Fiske dusts off the old "there's no arguing with taste" argument. He states that L1's thinking that a performance is expressive is just as true for him as L2's thinking it was not. I have no quibble with that as far as it goes. The problem I have concerns Fiske's causal story. He claims that knowledge of style, performance practices, etc. have no effective bearing on a listener's affective response. Remaining loyal to the APV, he states that "the human auditory perceptual system is the final arbitrator in expressive performance contests" (Fiske, 1993: p. 124), taking other non-auditory factors, such as rational or ideational means of judgment out of the picture. However, the real moral to Fiske's story is in his conclusion that affective response is the product of (i.e., caused by) T-R manipulation.

Thus, according to Fiske, the causal story for musical affective response is by necessity tied to the APV. While there may in fact ultimately be a causal explanation for affective response, my quibble is in the insistence of its being a *formal* cause. In the alternative conceptual framework I am suggesting, in which music cognition is supervenient upon the effects of a wide and irregular environment, the story will of necessity be more complex, but no less valid. The interesting part of it is that my alternative proposal does not invalidate the claims of CTM, but rather puts CTM into its proper perspective, and effectively removes the basis for its universality claims.

8.5.1.c On *Principle* 4: criteria for appearance-value

Recall that Principle 4 states that "appearance-value (AV) is the nonsemantic evaluation of an overt response to the decision-type product of P-K comparison tokens" (Fiske, 1993: p. 134). Fiske sets up a double standard in his description/explanation of criteria for AV.²¹ Concerning the two listeners (L1 and L2) listening to the tuning of two pitches, recall that Fiske argues that there is no independent standard of correctness (i.e., truth) for *hearing as*. Fiske argues that L1 and L2 are *both correct* in their disparate judgements of pitch. The conclusion he reaches is that truth preservation and predictability are limited to the auditory judgement of the individual listener. My complaint is that Fiske does not permit the same standards for so-called "felt response." In other words, the question arises why Fiske does not permit an equal result concerning affective experience as he does for auditory experience: that is, that L1 and L2 both be deemed to be correct in their experiencing of either joy or sadness in response to the same musical passage.

Fiske explains (in *Criterion 2*) that affective experience itself is not caused by an aesthetic decision (i.e., a P/P'/Pn decision) but rather but by some "life experience or event." (See above). Thus, affective experience A, being true only in terms of some 'nonmusical' event (i.e., outside the realm of T-R pattern relationships), has nonreal status as AV. The truth or falsity of the experience, according to Fiske, is not linked to the aesthetic (i.e., the P/P'/Pn decision). The question remains, however, how the "felt response" is evoked by the P/P'/Pn decision-type D. In my view, Fiske fails to explain properly the connection among the components of the "felt response" -P/P'/Pn decision-type-life experience trichotomy.

Let us go back to the criteria Fiske imposes for AV. *Criterion* 1 states that AV is caused by (and not reducible to) a P/P'/Pn token. Affective experience A is caused by life event X and property AV "evokes" affective experience 'A.'²² If, as it has been said, AV is caused by a decision-type aesthetic, then in my view, it is not stretching the point very far to interpret this

^{21.} See my comments on Principle 2a for a discussion of truth and falsity in terms of AAs.

^{22.} Standard dictionary definitions ascribe the term, "to evoke" as variously to conjure, describe, elicit, induce, prompt, resemble or summon. On the other hand, to "cause" means variously to compel, effect, produce or prompt. There seems to be an element of cause (broadly conceived) in both terms. My question is, how fine a point is Fiske attempting to carve between the two notions? Perhaps there is not as much difference between the terms as Fiske may imply.

as meaning that AV is in a *causal relationship* to (though not the sole cause of) affective experience. Then if AV is not the sole cause of musical affect (and I do not understand how it could be), it is probably at least contributorily causal. If so, then it would not be stretching the point very far to say that there is a causal chain (or better, network) of musical meaning which includes at minimum, such factors as the aesthetic decision-type, life experience and musical affect. In my view, there does not seem to be a convincing way to segregate life experience from musical experience; and that is perhaps how it should be. The problem is that because CTM's conceptual framework is premised on a scientific view of music, the segregation is inherent in the methodology. Therefore, I see the principal task of CTM as finding a means to reintegrate scientifically conceived musical experience into the manifest image of music.

8.5.1.d Overtness, covertness and persons

I am not sure if Fiske has cleared up the issue of the difference between the terms 'overt' and 'covert' completely, because he is not clear about something that he discusses earlier concerning the listener's involvement in the choice of exit points in the decision hierarchy. That is, it is not entirely clear whether the listener *chooses* to exit the decision hierarchy or whether the exiting is an involuntary or mechanical processing step which occurs automatically. Specifically, the confusion is created in the following four statements made by Fiske: (1) "the listener's decision regarding the relationship between two patterns is the outcome of negotiating a multitiered, pattern-processing hierarchy" (Fiske, 1993: p. 113); (2), "each of these stages serves as a potential exit level for the listener" (Fiske, 1993: p. 114); (3), "apparently the listener deals with an organized (and experimentally identifiable) sequence of task decisions rather than an unconnected array of P-K comparison questions" (Fiske, 1993: p. 114); and (4), "at some terminal point in the processing *selected by the listener* (voluntarily or involuntarily -- due to interest, listening capability or whatever) L makes a decision about the P-K [interpattern] relationship" (Fiske 1993, p. 122).

I see three possible ways to explain the apparent inconsistencies in those statements. One possible interpretation is that when Fiske uses active terms (e.g., "the listener's decision," or "potential exit," or "the listener deals with"), he is in fact anthropomorphizing the cognitive apparatus by referring to it as "the listener." Perhaps a more scientific consistency of terminology is in order, in order to make it perfectly clear that the processes being described are either available to or impervious to introspection (even though the processes described above are supposedly impervious to inspection). A second possible (and not flattering) explanation is that Fiske is simply inconsistent in his theorizing. If in fact the listener does make decisions about processing at a level postulated as 'covert,' when such activity is actually not entirely covert, then Fiske opens himself to problems concerning the internal validity of his theoretical framework. A third possibility is that, if there is indeed an active force (i.e., an introspective listener) doing the work at the so-called 'covert' level, then Fiske is exposing himself to a form of Cartesian dualism, with the so-called 'listener' acting as a kind of homonculus, watching over and guiding the proceedings of cognitive processing. If this is the case, then it goes against the materialist (anti-dualist) orthodoxy of modern cognitive science.

In any case, Fiske does not resolve any of the above inconsistencies. On a broader plane, the inconsistencies in terminology alluded to above have more to do with the fundamental problem that promoters of the scientific view of man-in-the-world have in explaining human activities such as music. It is difficult for Fiske (and others who promote CTM) to avoid using terms such as "listener" when they mean something more connected to a materialistic description of the workings of a hypothesized music cognizing apparatus operating inside a human listener.

The listener in my sense of the word is a person who lives in a world which has, among other things, music. A listener, then, is a person who encounters, learns, does, absorbs, enjoys and makes judgments of music. That is, a listener is a person who exists in a manifest world which has music in it. The problems begin when the scientific world appropriates terms which are intuitively and substantively a part of the manifest world and uses them to describe a scientific world. In my view, the term 'listener' is not a good starting point to describe atomistic processes, but the scientific effort has not much choice as long as it promotes the assumption that the manifest world supervenes on the scientific. I contend that I have here a good case for arguing the reverse. I shall come back to this point in Chapter 10.

8.5.2 Innateness, community and musical formalism

Recall that Fiske (in his pre-theoretical premises) claims that humans have an innate capacity to relate to certain sounds *as music*. He also claims that an individual receives categorizations of musical and non-musical concepts from the community. He claims as well (on the Fodorian model) that musical objects are 'auditory information-bound.'

There are several items to unpack from the above claims. However, my first task will be to demonstrate how Fiske's APV-based philosophical position relates to his account of music cognition. On this account, Fiske claims that

specialized mechanisms have specialized functions, and they are limited to processing restricted forms of information. *Musical patterns are auditory-information bound*. As such, pattern construction mechanisms are incapable of recognizing non-auditory information since they are not designed to interpret that information even if in some way it could be sent to these mechanism, which it cannot. (Fiske, 1990: pp. ix-x, my italics)

At first glance, one would assume that the logical conclusion to the italicized section

above is that non-auditory information must be categorized as 'nonmusical.' Fiske confirms this

conclusion when he states that

musical unity is limited to the comparison of patterns that are perceived aurally, and that emanate from the structure of an (aural) music language. Other claims of unity, that is, those created from rule systems outside the boundaries of the tonal-rhythmic language, are, at best, artificial and, at worst, fictitious. (Fiske, 1990: pp. x-xi, Fiske's parenthesis)

Fiske gives examples of so-called 'nonmusical' factors as "mathematically derived ratios and mathematical devices...pictorial devices, where a visual or linguistic concept serves as an organizational principle for tonal elements (e.g., shapes, letters {e.g., B.A.C.H.}, lines, objects) or, occasionally, as an end in itself, where the tonal result is secondary to the visual impact of the score (see, for example, *Notations* by John Cage {1969})" (Fiske, 1990: p. ix, Fiske's parenthesis). Fiske's APV-based view is further confirmed when he grants 'nonmusical' status to relationships in terms of what he identifies as "compositions inspired by or intended to convey programmatic or imitative associations" (Fiske, 1990: p. ix).

The extent of the internalistic bias in Fiske's definitions of music cognition and what he deems to constitute a 'musical' sound object make it difficult to understand how a community could *ever* have influence on a listener. That is, the question persists how a community could have the least influence on an individual's decisions as to which sounds are deemed 'musical' and which are deemed 'nonmusical.' Fiske stipulates that the communication between community and individual listener must occur in terms of "a sound object [which is] accepted by a human community as representing a musical concept (with all of the intentions and expectations assumed by a concept of Music)" and can occur only when a musical concept is stipulated to be strictly within, as he states, "the boundaries of the tonal-rhythmic language" (Fiske, 1990: pp. viii and xi). On this account, musical concepts can be transmitted from the community to the individual only by means of a language embodied exclusively by tonal-rhythmic patterns, and not by any other means.

In effect, Fiske's claims are loaded with unsupportable assumptions. First, it remains to be seen how so-called 'musical' concepts (which, on Fiske's account are embodied exclusively as tonal-rhythmic patterns) are transferred from the community to the individual. Second, Fiske is remarkably unconcerned how a community arrives at assumptions as to *which* tonal-rhythmic patterns in the whole acoustic array count as specifically 'musical' patterns. Third, Fiske needs to explain how a notion of what constitutes a 'musical' sound object can be successfully communicated if the only means available for 'musical' communication is through the transmission (from community to individual) of the tonal-rhythmic patterns themselves. There has to be some additional information over and above that which is instantiated in a mere tonalrhythmic pattern to render itself powerful enough to be engaged in a successful transmission (as a musical concept) between members of the community and the individual. In other words, Fiske has yet to complete the task of explaining what specifically it is that distinguishes 'musical' from 'nonmusical' tonal-rhythmic patterns before he can even begin to explain how either category is communicated as such between the community and its individuals.

Fiske hints that if it is true that humans have a unique capacity to process tonalrhythmic patterns *as music* in terms of "assumed intentions and expectations [that] imply specific cognitive processing for realizing musical content and for fulfilling the musical process from sender to receiver" (Fiske, 1990: p. viii), then one would assume that naturalizing the APV and therefore, <u>music</u>, <u>is but a short step away</u>. He confirms this <u>suspicion</u> when he concludes that "if the above is true, then it is a short step to a principle of universality" (Fiske, 1990: p. viii). The process of communalizing the musical sound is thus based on a self-fulfilling prophecy. A sound object is first accepted by a community as representative of a 'musical' entity. Since the music cognizing mechanism can only receive and process tonal-rhythmic information through formalized mental structures, the cognizer can only transmit back to the community that which is deemed (in terms of an APV-based musical ontology) to be 'musical.' Thus, through a process of circular reasoning, Fiske binds together the trichotomy of innateness, community and aesthetic formalism.

The problem with claiming that humans have an innate capacity to cognize music is that a rationale has to be created for a set of natural mental processes or structures that are intrinsically 'musical.' Although I suspect that Fiske has contradicted himself on that count (stating that a sound object must first be accepted *as music* by a community), I would not think that such a contradiction would deter him from saying (by way of explaining the evident contradiction) that the members of a community accept a sound object *as music* because all members of that community are naturally predisposed to do so *by definition*, not because they get together and make decisions about such matters.

According to the cognitivist story, the community must be made up of individuals whose mental music cognizing apparati have basically the same design as the idealized listener. They too have no choice about deciding on the 'musicalness'²³ of a sound object because logically they too are subject to the same processes as our listener. For that reason, I cannot take seriously Fiske's deference payment to the effects of culture or community on the ontological status of music, principally because Fiske does not in any way mean to infer that a community's version of what is musical goes beyond the domain of the sound object.

I suspect that Fiske's purpose for bringing in the "effects of the community" argument is meant more to camouflage the intent of the theory (i.e., to naturalize the aesthetic attitudes) than it is to offer substantive explanations of the real effect the community may have on an individual's cognition of music, especially if in fact the community's belief systems about the ontology of music were to entail an encompassing of a wider-than-sound-object domain. According to the stipulations of Fiske's definition of music, that would be an impossibility. The problem, however, is not simply one of definitions. As mentioned concerning other points of criticism, it is more crucially an issue of supervenience, an issue which I touch upon in the final section.

8.5.3 Musical meaning and musical communication

If music is a (meta)language (in the sense that Fiske intends), I suggest that two intuitive questions must arise: first, what form does 'musical meaning' take; and, second, what kind of relation persists between a listener and his or her social/cultural milieu resulting in so-called 'musical communication.' I shall undertake to elicit from his statements on the matter what Fiske's answer might be to those questions. In the process, I shall demonstrate that for Fiske's answers to make sense, any explanations of the notion, 'musical meaning' must by force be offered within the bounds established by the APV.

To that end, Fiske presents a challenge to detractors that it must be shown that "(a) certain propositions concerning the existence of (non-referential) musical meaning are true, and

^{23.} I avoid the term, 'musicality' because it has other meanings which do not pertain to my point here.

(b) that such meaning *can* be communicated, and that these concerns are explainable while maintaining a consistent Constructionist position" (Fiske, 1990: p. 64, Fiske's italics and parentheses). For the record, the third condition effectively negates the viability of demonstrating the first two. First, he argues that it must be shown how the decision-making process at the processing level pertains to the interpretation of musical performance, allowing for variances in interpretation from performance to performance as well as allowing for variances in interpretation between (or among) performers. Then, it must be shown how to create a description of the substance of 'musical meaning' (what it consists of, how it is structured) in terms of the pattern decision-making process. Finally, it must be explained how 'musical meaning' is then communicated within a Constructionist position.

Fiske begins by asking a hypothetical question that if in fact such a cognitive entity as an interpretation hierarchy were to exist, how would such a hierarchy conform to the notion of a decision-making processing hierarchy? On the basis of this question, Fiske makes two provisional presuppositions: first, he states that the "processing hierarchy is a hypothetical construct...an analogy for whatever explains music decision-making behavior"; and second, he states that "interpretation is represented by manipulations of structural components...[and] is really a refinement of the series of questions concerning pattern structure" (Fiske, 1990: p. 73). On the basis of these premises, Fiske moves quickly to conclude that since both the music decision-making processing hierarchy and the process of interpretation are both processes involving the "manipulation of structural components" (i.e., the manipulation of pattern structures), then he states that they must be one and "the same hierarchy. Therefore, both structural relationships and interpretive relationships are realized cognitively through the same general processing format: detection, discrimination, identification, and evaluation of pattern differences" (Fiske, 1990: p. 73). Thus, according to Fiske, pattern structuring and pattern interpretation are linked by the same formalistic processing format.

However, the significant difference between the two processes is that pattern construction is involuntary and passive, and as we shall see, Fiske thinks of pattern interpretation (and subsequent meaning assignment) as an *active* process. I would take the term, 'active' to imply that the listener consciously makes decisions concerning the pattern interpretation process. I shall discuss the difficulties with this view shortly. Let us accept for the moment, that the processing format for pattern construction and pattern interpretation is the same, but the processing layers differ: that is, the pattern construction layer is believed to be located in the 'vertical module' (i.e., the Input Systems) and the interpretation and meaning assignment layers are in the 'horizontal module' (i.e., in Central Systems).

Therefore, for interpretation to take place, Fiske states that the listener can (actively) choose either an

interpretation-loaded P-construct over others that potentially may be available...[or] comparisons of presented patterns are made against two or more interpretation-loaded P-constructs simultaneously...[or] listeners do not select any single interpretation in particular (none may be recalled), but recall pattern structure alone instead, that is, structure devoid of interpretation. Undoubtedly, the choice between the three possibilities is the listener's own. (Fiske, 1990: p. 75, Fiske's parenthesis)

Thus, pattern interpretation is deemed to be restricted to the formality conditions imposed by the system. That is, an interpretation of a newly-encountered pattern must be made *in terms of some other pattern*. Another way of expressing it (in computational jargon) is that patterns function as symbols for comparison to other symbols (i.e., patterns). Therefore, on the basis of the notion of symbol manipulation, Fiske's concept of 'musical meaning' is actually a variation on the Turing computationalist model.

Once the pattern comparison task is completed, Fiske states that "concern for musical interpretation leads to concern for musical meaning" (Fiske, 1990: p. 75). However, according to Fiske, a truly 'musical' interpretation cannot exceed the parameters of realized musical tonal-rhythmic patterns. To this end, Fiske makes his APV-based (i.e., anti-referentialist, anti-expressionist) position clear when he states that

in fact, any argument that attempts to equate meaning in music with *semantic* knowledge or belief is doomed from the outset (not that attempts have not been made) and is, overall, a relatively pointless endeavour. To do so leads either to Referentialism, which most aestheticians today do not accept, or Expressionism, a position which often looks right, but which relies on a good deal of faith. (Fiske, 1990: p. 76, Fiske's italics and parenthesis)

Fiske states clearly that because a semantic expression of musical knowledge or belief must be taken on faith, being unyieldingly linked with the Referentialist and/or the Expressionist positions, a provable (and correct) hypothesis of 'musical (i.e, non-semantic) meaning' is not possible without first espousing the APV.²⁴

The central problem then, as Fiske sees it, is to find a way to explain how the listener expresses 'musical meaning' (to himself?) if it cannot be expressed semantically. Concerning the question of gaining access to an explanation of the *expression* of 'musical meaning,' Fiske asks, "(1) if musical meaning finds no expression through *semantic* knowledge, belief, or truth, how can the nature of such meaning be articulated semantically?; and (2) is an investigation of a qualitative factor, such as meaning, out of place where the primary concern has been quantitative differences between pattern processing tasks?" (Fiske, 1990: pp. 76-77). In terms of the first part of the question, a possible solution (but not entirely acceptable to Fiske) might be found in Meyer's answer, who proposes that musical meaning is "embodied" in a musical pattern, as an inherent part of that pattern.²⁵ Fiske's answer to the second part of the question reveals a hint of the direction he wishes to take. His answer follows the internalist line proposed by Fodor and Chomsky (earlier described) that the nature of 'musical meaning' is inevitably dependent upon the particular brain-type of humans, that is, by its particular concept-forming capacity and by its capacity to permit learning to take place. To that end, Fiske states that

the realization of musical meaning (*whatever* its nature) must follow cognitive processing. Indeed, it is assumed that the purpose of this processing, beyond the construction of patterns, is a communication product of some kind that can only be derived from the pattern comparison process itself. (Fiske, 1990: p. 77, Fiske's parenthesis and italics)

^{24.} For the moment, I shall assume intuitively that Fiske segregates the notions, 'musical meaning' and 'semantic knowledge or belief.' Let us take Fiske to mean at face value, that he is using the term, 'semantic knowledge or belief' in connection with the notion of truth value as expressed in natural language.

^{25.} Remember that for Meyer, 'musical meaning' is located in the expectation of a subsequent musical event.

Thus, for Fiske, an explanation of the *expression* of 'musical meaning' is simply a matter of the system investigating the pattern decision-making hierarchy and asking questions (about tonal-rhythm patterns) at any point in the process. According to Fiske, an expression of 'musical meaning' depends upon what stage in the hierarchy the investigation halts. Fiske claims that

questions of [musical] meaning are a reflection of hierarchy penetration within the communication layer; the significance of the questions of meaning are a reflection of the depth of penetrating the hierarchy, but are not a reflection of a particular level of that hierarchy. (Fiske, 1990: p. 79)

So, at this point, we need to know what Fiske means by the notions, 'belief-value' and 'knowledge-value' (usually associated with language) specifically in terms of how they relate to the notion, 'musical meaning.' 'Belief-value' depends on which level the listener penetrates into the hierarchy. Fiske defines 'belief-value' as "the P, P', or Pn decision. It concerns pattern identity. It is the belief that 'the comparison pattern is the same (/derived from/different from) the given pattern''' (Fiske, 1990: p. 80). Fiske claims that 'knowledge-value' "reflects the extent of hierarchy penetration by [the listener]: the greater the penetration, the greater the knowledge-value. (The greater the knowledge, the greater the understanding of pattern function.)'' (Fiske, 1990: p. 80). Thus, Fiske concludes that

belief-value and knowledge-value about tonal-rhythmic relationships constitutes musical meaning..."Meaning" is the epiphenomenal result of the two...In this way musical meaning has no association with knowledge-value, belief-value, or truth-value in their usual *semantic* sense beyond the articulation of realized pattern relationships as one works his way through the listening task hierarchy. (Fiske, 1990: p. 81)

Thus, according to Fiske, a listener's manifest view of musical meaning (i.e., the beliefvalue and knowledge-value the listener derives from a piece of music just heard in a real listening situation) is in two senses predicated upon an internalist (constructivist) explanation on two counts: first, that 'musical meaning' originates from internal cognitive processes; and second, that 'musical meaning' is a product of tonal-rhythmic pattern comparison procedures. In other words, if a listener were to hold a belief about a piece of music (just heard) that was outside the parameters involving the comparison of tonal-rhythmic patterns, that belief would have to be taken (on Fiske's view) as false or at best, an illusion. That is, according to the design of the 'rule management systems' model, the so-called "facts" produced as computational realizations of pattern processing are the only true and real musical facts worthy of discussion.

In my view, Fiske reaches that conclusion because those so-called "facts" are founded upon a self-limiting APV-based definition of music cognition, which Fiske claims is "limited to the construction of tonal-rhythmic patterns from acoustical information, events, and the comparison of this pattern against previously presented patterns and new incoming events" (Fiske, 1990: p. 26). Fiske states that those elements which remain "outside the domain of the music module - mathematical relations, notationally derived relations, [and I would assume historical, cultural influences] etc. - which are not expressly realizable tonally or rhythmically...must remain for us as notational artifacts that pass unrecognized by our own particular auditory processing structures" (Fiske, 1990: p. 84, my italics). That is, if there is processing going on which does not have to do with the processing of tonal-rhythmic patterns (constructed from the auditory domain), that brand of processing is not, by definition, music cognition because processing structures for so-called nonmusical information are incapable (by definition) of recognizing auditory information as music.

Therefore, on this model, music communication (between composer and listener) becomes a matter of finding a compatibility level between a composer's (and, by extension, a performer's) and a listener's rule system for processing and realizing tonal-rhythmic patterns. According to the 'rule management systems' model, the extent and success of the communication is of consequence dependent upon the extent of penetration by the listener's cognizing apparatus into the task hierarchy for processing tonal-rhythmic patterns, to the exclusion of all other so-called 'nonmusical' processing tasks. To this end, Fiske states that "music cognition is limited to identifying such relationships, and the extent of communication is dependent upon the success of the music cognition process" (Fiske, 1990: p. 84). It is upon the

above point that leads Fiske to the formulation of Axiom 6, which in effect constitutes his full

definition of 'musical meaning.' He states that

musical meaning is the set of realized (i.e., constructed by the listener) tonalrhythmic relationships resulting from the relative success in penetrating the musicdecision hierarchy; depth (profoundness, richness, etc.) of meaning is dependent upon extent of hierarchy penetration. (Fiske, 1990: pp. 85-86)

This definition gives us the basis for establishing a definition of musical communication. To this

end, Fiske states that

comparison activity (and its resultant meaning) represents the essence of the musical process from composing to performing to listening. The extent of agreement between composer, performer, and listener concerning the quantity and quality of pattern relationships represents the essence of the communication process. Together, they represent the purpose of Music in its widest intellectual, aesthetic, and cultural function. (Fiske, 1990: p. 86)

If we are to accept Fiske's rulings on musical meaning, musical communication and ultimately (as he states) the real *purpose* of music, we must also accept his explicit *naturalizing* of the APV. According to the sum of Fiske's claims, it would seem that the APV underlies (and is causal to) the internal processes leading to musical meaning and musical communication. In my view, the naturalizing of the APV is all Fiske needs to rationalize the purpose of Music in an all-embracing "intellectual, aesthetic, and cultural function." That is because all non-APV-based purposes of music are deemed (by definition) to be invalid because they do not adhere to the functions of natural musical processes.

On that basis, if I understand Fiske correctly, the formalist, referentialist and/or expressionist arguments cannot be taken as adoptable views (or stances) which function in terms of leading us to an understanding of music. On Fiske's model, there is no need for such discussion because the features of the system itself preclude such decisions from being valid. It would also seem that in terms of Fiske's model, such activity would be redundant.

That is where Fiske and I part company. I argue that the adoption of any or all of the above positions as stances or points of view for understanding or experiencing music is something a listener can engage in at will. I contend that a listener can also *learn* to engage in

such activity. Fiske disagrees. He says the listener *cannot* engage in referentialist or expressionist thinking (or even learn to do so) because the music cognizing apparatus is not predisposed to do so.

8.6 Conclusion

In setting the above conditions for music cognition, it ought to be reiterated that Fiske constructs his argument in terms of the scientific supervenience explanation. That is, what music means and how it is communicated in manifest listening situations supervenes on a scientific explanation of 'covert' cognitive activity. As stated throughout this study, these explanations are founded on the premises of the APV. Therefore, as the APV-based CTM story goes, a definition of music (manifestly conceived) must first shed itself of so-called 'nonformalist' (and therefore, nonmusical) connotations.

My answer to the above conclusion remains the same for Fiske's 'rule management systems' model as it does for the other CTM models discussed in this study. That is, since the APV itself derives its model for so-called "artistic truth" from a particular historical and cultural situation, the APV is itself a product of a particular culture's manifest image of music. Recall that musical meaning and musical communication, described in terms of the APV, are the products of the contemplation of the observable formal properties of works of fine art. Thus, I have demonstrated that the so-called scientific account is not universal, objective, or primary, but rather derived from a culturally specific point of view. I am not interested in setting the stage for a reversal of this view, but rather wish to expose the parochial-ness of that view.

Chapter 9

Contra the Aesthetic Point of View

9.1 Introduction

I have said earlier that in a general sense, the term 'aesthetics' refers to the philosophy of art. More specifically, as explained in Chapter 2, the term came to be narrowly conceived as referring to a particular type of inquiry which emerged in the eighteenth century coinciding with the invention of the 'Faculty of Taste.' In this narrower sense, 'aesthetics' became the study of the human perception of qualities such as beauty, expressiveness, formal unity, intensity of regional quality, etc. It followed in the nineteenth century that aesthetics (narrowly conceived) was not just viewed as being about the study of art or even about art itself but rather it had become the study of the particular kind of human experience that is elicited by artworks, and even by natural phenomena and nonartistic artifacts. The differences among views about aesthetics has led to an oft-made conclusion that if aesthetics is not about art *per se*, then at least art, as sense experience, is primarily about the aesthetic.

However, I contend that this conclusion is problematic because aesthetic experience (narrowly conceived) is neither a necessary nor a sufficient condition for the apprehension of all works of art. If the art (and subsequently, the aesthetics) of the twentieth century has achieved anything, it has broken the perception/cognition chain required by the APV. In this regard, Timothy Binkley states that

art in the twentieth century has emerged as a strongly self-critical discipline. It has freed itself of aesthetic parameters and sometimes creates directly with ideas unmediated by aesthetic qualities. An artwork is a piece: and a piece need not be an aesthetic object, or even an object at all. (Binkley, 1987: p. 81)

Binkley notes that aesthetics places its emphasis on media for classifying and identifying artworks in order to set an agenda on the nature of art. He claims that in doing so it has failed to recognize what he identifies as the "thoroughly conventional structure within which artworks appear. This is because aesthetics tends to view a medium as a kind of substance (paint, wood, stone, sound, etc.) instead of a network of conventions" (Binkley, 1987: p. 89). Binkley argues that the preoccupation in aesthetics with the perception of artworks has resulted in the averting of attention from the complex cultural activity which goes on when we call something 'art.' Binkley contends that "what counts as a work of art must be discovered by examining the practice of art. Art, like philosophy, is a cultural phenomenon, and any particular work of art must rely heavily upon its artistic and cultural context in communicating its meaning" (Binkley, 1987: p. 90). I follow with the argument that music cognition theory is also in itself a cultural phenomenon since it is in large part based on the tenets of the APV, which has been established as being in itself a phenomenon of the culture from which it emanates.

I agree with Binkley that the meaning of a piece of music (or any artwork, for that matter) is communicated within an artistic milieu, and that milieu is not established solely by the perceptual qualities of the work, that is, by its appearance. In other words, the artistic milieu is not established by the union of the physical features of the medium and the concomitant perception of the observer, as presumed in the APV. The task then remains to explain what, in terms of the above, an artwork really is. Binkley defines an artwork as

a piece. The concept 'work of art' does isolate a class of peculiar aesthetic personages. The concept marks an indexical function in the artworld. To be a piece of art, an item need only be indexed as an artwork by an artist. (Binkley, 1987: p. 93)

Binkley refines his definition by claiming that

a work of art is not necessarily something worked on; it is basically something conceived. To be an artist is not always to make something, but rather to engage in a cultural enterprise in which artistic pieces are proffered for consideration. (Binkley, 1987: p. 93)

What does that say for the cognition of artworks? It says that awarenesses on a variety of levels, including that of artistic intention, that of the artist's position in the particular artistic culture, and that of the cultural milieu all are necessary components for the cognition of art.

Pertinent to this point, Binkley states that

art is a practised discipline of thought and action, like mathematics, economics, philosophy, or history. The major difference between art and the others is that doing art is simply employing indexing conventions defined by the practice. The

reason for this is that the general focus of art is creation and conception for the sake of creation and conception, and consequently the discipline of art has devised a piece-making convention which places no limits on the content of what is created. (Binkley, 1987: p. 94)

For the art of the twentieth century, the conventions of what constitutes art loosened to the extent that, at its most abstract, art became purely conceptual. As the notion of conceptuality came more into favour, the importance of media decreased. Consequently, the notion of 'artwork,' suggesting an object (i.e., a song, painting, statue), was replaced by the notion of 'piece,' which Binkley states, "suggests an item indexed within a practice" (Binkley, 1987: p. 94). Thus, an artwork has come to be, according to Binkley, "just a piece (of art), an entity specified by conventions of the practice of art" (Binkley, 1987: p. 94). Then, if artworks are not to be identified extensionally (contra aesthetics), they certainly are identified intensionally, because rather than being differentiated as objects, they are differentiated as ideas. Thus, an artwork is not located by its properties but rather contextually, or, as Binkley states, "by its location in the artworld. Its properties are used to say what the particular work is" (Binkley, 1987: p. 97).

On the other hand, aesthetics, by definition, must treat aesthetic experience, not art itself. On that account, aesthetics can function as the basis of understanding anything, including artworks. Concerning this issue, Binkley states that

not all art is aesthetic. Seeing its marriage to aesthetics as a forced union, art reaches out to find meaning beyond its skin deep looks. The indexers create with ideas. The tools of indexing are the language of ideas, even when the ideas are aesthetic. (Binkley, 1987: p. 97)

To illustrate and fortify the above contention, I shall make a short survey in this chapter of some of the more important idioms to emerge in twentieth-century art music. This will be achieved with a view to explaining to what extent a cross-section of conceptual and/or relational (and specifically nonaesthetic) frameworks has motivated the creation of musical works in this century, and to what extent these so-called 'nonaesthetic' frameworks constitute their essence. This will also be done with a view to establishing new or at least alternative criteria on which to base the concept of music cognition. As stated earlier, it is not my contention that the APV (in its present relation to music cognition theory) should be replaced with an alternative aesthetic view or even eliminated, but rather that it should be historically and culturally contextualized. I contend that considering the APV as a culturally contextualized stance for apprehending music will result in an alteration of its present ontological status (in terms of CTM) to that of occupying a more appropriate theoretical role for the purpose of examining such aspects in music as formal analysis.

9.2 Twentieth-century music and cognitivist music theory

Musical composition in the early part of the twentieth century is roughly split into two general paradigms. First, is the 'proto-tonality' paradigm (e.g., Schoenberg to Messiaen to 1950's neo-seriality), which can be understood as a manifestation of the breakdown of eighteenth- and nineteenth-century tonality. I shall call the second the 'sonic entities' paradigm (e.g., Varèse and Xenakis), in which the traditional notion of tonal and rhythmic patterns was eclipsed by the notion of blocks of sonic material, moving in a spatial setting. Stockhausen's 'general seriality,' is perhaps a third paradigm which somehow is a hybrid of the first two, being prototypical of serialism as a technique of organization but using the notion of sonic entities in its realization.

As indicated throughout this study, with little variation, CTM is drafted in terms of a historical and cultural perspective which roughly coincides with the European art music of the eighteenth and nineteenth centuries, described as the Common Practice Period (CPP). During this period, there was remarkably little change in the materials of music and the manner of their use. As noted earlier in this study, the CPP coincided with the establishment of the APV as a philosophical approach to fine art.

One of the central principles of musical composition in the CPP is tonality. While most music may be considered to be tonal (in the most general sense of tone production), the

technical notion of tonality is defined as the preservation of 'key,' that is, a loyalty to a central tone (the tonic). In other words, the individual tones of a tonal musical composition are always in a functional relation to the tonic pitch. In the CPP, the major and minor scales and triadic harmony are part and parcel of the tonal system and are normative elements of all music composed during this period.

However, the long-held preference for a central tone in musical composition was in the process of being abandoned late in the late nineteenth and early twentieth centuries, along with those other accoutrements of tonality, the major and minor scales and triadic harmony. This coincided with the rise of so-called 'atonality,' which is premised on the rejection of the notion of a central tone. Although no singular common compositional principle has come to be identified with all twentieth-century music (even Schoenberg's radical break with tonality with the introduction of twelve-tone serial technique, known as the Second Viennese School), composers of so-called 'serious' music in the early twentieth century (except those who adopted 'neo-tonal' styles) studiously avoided composing within the tonal parameters of the CPP.

In addition to the rejection of tonality, there have been other major breaks with the Common Practice tradition in twentieth-century music. In terms of the formal (global-temporal) organization of music, composers in the twentieth century have greatly dispensed with the favoured repetition-based forms of the CPP, including variation form, sonata form and rondo form, and as well as the continuation-based forms such as ricercar and fugue. In the twentieth century, there have been many experimental approaches to the formal organization of music, as exemplified by extended ostinato form (minimalism), mobile form (random performer input), free improvisation and aleatoric techniques (chance composition). In terms of the sonic materials, twentieth-century composers have experimented with non-standard instrumentation (altered instruments or electronically generated sounds), noise, silence and environmental ambience.

In terms of pitch organization, twentieth-century composers have made use of the total pitch spectrum, which, in some cases, has resulted in a complete relinquishing of conventional
notation. In terms of local-temporal organization, composers have employed unconventional and complex rhythms and pulse patterns, which, in some cases, has resulted in the abandonment of traditional temporal organization.

A more recent development, which may change music forever, has been in the realm of computer music and computer-generated sound. With the creation of previously unimagined computer-generated sounds, the development of algorithmic and interactive composition, and the abandonment of traditional instrumentation, notational systems and even performers, it is apparent, for better or for worse, that a revolution in the world of music is taking place. As well, computer-interactive composition is blurring the traditional distinctions between the roles and activities of composers, performers and listeners.

It is my contention that these radical departures from traditional views of music and subsequent changes in musical art cannot be effectively accounted for by contemporary music cognition theories, especially if said theories continue to be founded on the APV. Unfortunately, questions are rarely raised in terms of CTM about whether the significant conceptual differences between the music of the CPP and the music of the twentieth century bear on accounts of music cognition theory, or whether psychological findings based on music cognition theory (framed as it is in terms of CPP music) would be different if it were framed in so-called 'nonaesthetic' terms (narrowly conceived), or finally, whether it is possible or even necessary to give a comprehensive account of music cognition framed in terms of the whole history of music. Such questions need to be addressed if music cognition theory is to achieve relevance as a scientific discipline.

Recall my argument that the failure to raise these questions is due to three false assumptions which are varyingly adopted by CTM. First, is the assumption held in CTM that the standard surface features of the music of the CPP (i.e., tonality, melody, rhythm, harmony and colour), qualify as musical constants, and as such are considered common to all musical idioms. This assumption is demonstrated by the almost consistent use in CTM of musical examples extracted from the CPP and the almost total absence of examples drawn from twentieth-century music (or in historical musical idioms not exhibiting those features). The result is that little, if any, attempt is made to explain music which may not exhibit the traditionally identifiable features or conceptual frameworks of CPP music. Recall L/J's remarks on the cognition of contemporary music. They conclude that much contemporary music is generally noncognizable because it cannot be cognized within hierarchical paradigms set by the tonal music paradigm.

A second reason for the failure of the above questions to be raised is due in part to the widely held assumption in CTM that composition, performance and listening must be dealt with as common cognitive activities. This is because of the generally accepted reduction of music cognition to the listening act. However, my task will be to demonstrate that, in terms of certain forms of twentieth-century music, the lines drawn between these activities do not follow the traditional paradigms found in CPP music.

A third reason for the failure of the above questions to be raised is due in part to a widely held assumption in CTM that the human apparatus for music cognition is innate and therefore operates on universal principles of organization commonly applicable to all musical idioms. As described earlier, innatist theories of music cognition operate on the assumption of a naturalized APV. My stated task is to reverse the present situation and de-naturalize the APV. With a de-naturalization (and a subsequent re-contextualization) of the APV, the postulation of a music cognition apparatus that is restricted to operating solely within the aural-cognitive domain must then be seriously questioned.

In the next several sections, I shall bring to light some of the significant ideas in music which have evolved in the twentieth century. My descriptions will be offered with a view to illustrating the necessity for embracing ideational (conceptual, relational) thinking as an important component of music cognition theory. My motivation for approaching twentiethcentury music in this way is based on two reasons. First, I wish to fortify my contention that to approach twentieth-century music (and, by extension, perhaps all music) aesthetically (narrowly defined) is inadequate and runs the serious risk of potentially misrepresenting (miscognizing?) it. Much twentieth-century music (and for that matter, much twentieth-century art in general), almost by definition, requires participants to engage in a level of ideational thinking that subsumes the perceptual (aesthetic, narrowly defined) experience of it. Second, it is my view that the subjective cognitive construction paradigm promoted by CTM ignores or subverts the very necessity for indexing pieces of music in the cultural milieu, as suggested earlier. Since the subjective cognitive construction of music is the only ontology permissible by CTM, I claim that it fails because it holds in store little more than an impoverished view of musical experience.

9.3 Ideational and cultural frameworks for twentieth-century music

9.3.1 The serialist paradigm

9.3.1a Schoenberg: from chromaticism to dodecaphony

One of the earliest innovators of twentieth-century music is Arnold Schoenberg. In the years after World War I, with the establishment of the twelve-tone technique, he made the bold move of completely rejecting tonality as the basis for musical composition. Joseph Machlis states that it was Schoenberg "who set the seal of his personality upon this development, and who played the crucial role in creating a new grammar and syntax of musical speech" (Machlis, 1961, p. 346). It must be stressed, however, that Schoenberg's innovations were neither revolutionary nor anarchic, but rather a culmination of a thousand years of European polyphony. On this point, Joan Peyser notes that "Schoenberg regarded himself as the figure whose duty it was to reestablish the formerly undisputed hegemony of Austro-German music...[a view which] is not to be interpreted merely as a symptom of megalomaniac thinking; it should be considered in the context of the milieu in which he grew up" (Peyser, 1971: p. 3). The artistic conflict between the Wagnerians and the Brahmsians is symptomatic of the forces of revolution and conservatism and of the philosophic conflict between Nietzsche's demand for the reorganization of society under the guidance of powerful leaders and Hanslick's defense of classical ideals. In moving away from strict diatonicism (with a desire to undermine the

traditional structures of the tonal system), Wagner experimented with extreme chromaticism, whereas Brahms composed completely and comfortably within tonality's traditional limits.

However, Schoenberg perceived something else that linked the revolutionary with the classicist. Peyser states that "each exhibited a linear, horizontal orientation in his compositional procedures which was, in a most conscious sense, derived from the late works of Beethoven" (Peyser, 1971: p. 4). Schoenberg, in his analysis of one of Beethoven's late quartets, the *String Quartet in F Major*, Opus 135, detected the beginnings of the technique of 'perpetual variation,' particularly in terms of Beethoven's developmental approach to the first three notes of the work. Schoenberg maintained that it was the concept of the germinal motive, rather than the notion of architectonic tonal divisions, that formed the primary motive in both Beethoven's and Brahms's composition. In point of fact, 'perpetual variation' was to become a cornerstone for much of the work of the Second Viennese School, which was to include Schoenberg's pupils, Webern and Berg. Thus, in looking to Beethoven and Brahms for his inspiration, Schoenberg never thought of himself as a radical but rather always as a classicist in the traditional sense. Although he owed much to Wagner's work in bursting the old tonal boundaries, Schoenberg never willingly donned Wagner's mantle of revolutionary.

Inasmuch as it is necessary to index (to use Binkley's term) pieces of art in their respective cultural and historical milieux, it must be stressed that this activity is not the same as taking a referentialist (anti-formalist) stance in assessing musical meaning. In one sense, Schoenberg's music moves away from referentialism (i.e., music with a program) to a level of abstraction that can be achieved only by extremely formal compositional motives. On this point, Peyser states that

the 12-tone technique put an end to a several-hundred-year period in which music was devoted to a dramatic-expressive ideal. The technique, as extended by Schoenberg's musical descendants of the 1950's and 1960's, developed into an abstract language devoid of extramusical implications. Music was not alone, among the arts, in developing along a more abstract path. It was a logical counterpart of that movement in the development of art in which its function, as Arnold Hauser has stated, 'of being true to life and faithful to nature has been questioned for the first time since the Middle Ages.' (Peyser, 1971: p. 10) However, in another sense, the technique of the perpetual variation of a melodic motive in twelve-tone composition was found to be inadequate in sustaining larger works. Formerly, the harmony of a work had served to provide the means to achieving structural unity of the form. To achieve a sense of structure in larger forms, Schoenberg resorted to extramusical resources such as poems or texts. The first large atonal work of Schoenberg was *Erwartung*, a monodrama set to a text of Marie Pappenheim. Schoenberg provided the libretto himself in his next large atonal work, *Die glückliche Hand*, which was an expressionist work involving the visual arts in its realization, with specific lighting effects indicated in the score. Schoenberg was interested in stretching the conceptual boundaries imposed by musical formalism. In those years, Schoenberg, a productive visual artist himself, was interested in the interplay of instrumental and spectral colour. In the *Farben* or ("Colors") movement of his *Five Orchestral Pieces* (1909), Schoenberg first used the technique of *Klangfarbenmelodie*, achieved by changing the timbre of a single, sustained pitch by moving it from one instrument to another. In this way, timbre becomes a formal property in itself, a point which is key to deposing Fiske's P, P', Pn trichotomy.

Schoenberg's compositional life can be seen as a development through three stages. First, was a period of post-Wagnerian romanticism, in which he still used key signatures and maintained the tenets of tonality. The best known works from this period is *Verklärte Nacht* (Opus 4), and *Pelleas und Melisande* (Opus 5), produced in 1902, the same year as Debussy's opera by the same title. The second, called the 'atonal-expressionist' period, witnessed Schoenberg's abolishing of the distinction between consonance and dissonance and the subsequent relinquishing of the sense of key. The best examples of the period are the *Three Piano Pieces*, Opus 11 of 1909, the *Five Orchestral Pieces*, Opus 16, and *Pierrot Lunaire*, Opus 21, of 1912. In this period Schoenberg's music is moving from a vertical (harmonic) mode to a horizontal (contrapuntal) one. Peyser notes that, in his *Theory of Harmony* (1911, Schoenberg

defined "consonance" as the clearer and simpler relation with the ground note, and "dissonance" as the more remote and complicated, holding a quantitative rather than a qualitative distinction between the two. Removing the qualitative distinction between consonance and dissonance eliminates the concept of the one being beautiful and the other ugly. The physical basis that Schoenberg thus provided for atonal composition resulted in the "emancipation of the dissonance," a process that was taking place in the most advanced composition in France (Debussy) and Russia (Scriabine) but without the accompanying verbal justification. The freeing of tones from "tonal" obligations implies that the historic process of adding chords to the harmonic vocabulary had finally come to an end. (Peyser, 1971: pp. 27-28)

The beginning of Schoenberg's final period, in which he introduced the 'twelve-tone method,' is signified by the *Five Piano Pieces* (Opus 23) of 1923. As Machlis notes, the evolution to the 'twelve-tone method' was not sudden. The use of serial techniques (present in the works of the second period) enabled Schoenberg to organize his thinking as it progressed towards its culmination in the 'twelve-tone method.' This point is significant for our study, in the sense that the APV now fails as a conceptual basis for comprehending the difference between the works of the second and third periods. That is because if the aesthetic experience of works of the two periods were to form the sole basis for music cognition, it would inevitably result in a listener's failure to differentiate between Schoenberg's use of non-twelve-tone and strictly twelve-tone versions of atonality. Peyser brings this point into the perspective of the cultural and historical milieu in which Schoenberg worked. She states that

although some of the developments of dodecaphony provide a kind of music appropriate for a scientific, technological age, the roots of that system lay in one man's way of viewing the world and his compelling manner of systematizing that view. The method which solidified Schoenberg's position in the history of music can best be understood in terms of the personal dynamics that motivated it. (Peyser, 1971: p. 10)

Thus, Schoenberg's work forms a bridge between the tonal, proto-tonal and tonal paradigms. The ideational progression Schoenberg followed in the artistic development of his music cannot be isolated epistemologically from the listening experience of it, as it is presumed in CTM.

The next section deals with serialism in terms of Stockhausen's specific notion of 'general serialism,' in which each aspect of a musical composition is subjected to serial treatment. As with the previous section, I shall offer a running commentary in order for the reader better to understand my argument as it pertains to CTM in respect to each aspect of the musical model being discussed.

9.3.1b Stockhausen: general serialism

Stockhausen makes a claim that the notion of communal listening has largely been shelved by the public due to the availability of recorded music. He also claims that the performance forms of the eighteenth and nineteenth centuries (symphonies, opera, oratorio, etc.) are anachronisms. It is also interesting to note that Stockhausen's ultimate goal is to bring audiences back to communal listening through the medium of electronic music. That is because, unlike the living rooms of record buyers, concert halls can be designed specifically for the purpose of listening to electronic music, by providing the highest level of listening experience through the technical innovations of hall design and sound production. Stockhausen says that when this happens, communal listening and the social function of musical art will return.

Whether the reader finds agreement or disagreement with Stockhausen's views, they nevertheless provide valuable insight into the composer's views on aesthetics, and subsequently how his views might impinge on CTM. Stockhausen sees the composer of the twentieth century as having the potential to have complete control over sonic materials (particularly through the media of electronics) in the production of musical works, both in terms of their composition and performance. Stockhausen's conceptual framework for this complete control of materials and performance is founded in his notion of 'general serialization.'

As a pupil of Webern, Stockhausen continued the work of the Second Viennese School to expand the notion of serialism as manifested in the twelve-tone series to include every element of a musical composition, that is, its rhythm, timbre, dynamics, densities, etc. For example, in *Zeitmasse* (1956), for five woodwinds, Stockhausen designs the work so that every element interrelates. Machlis comments that

the design of this work is articulated with maximum clarity because of the way in which individual notes are emphasized within the texture. Pitch function in the closest possible relationship to tone quality, register, density, and color; this is obvious from the appearance in the score, where practically every note (save in the rapid passages) has its own dynamic marking. (Machlis, 1961: pp. 431-432) Stockhausen's musical aesthetic (broadly conceived) requires a rejection of old habits, the goal of his efforts being to explore the elements of music not as static entities but rather as manifestations of the notion of 'process.' He explains that that is

the constant goal of all my searches and efforts: the power of transformation—its operation in time: in music. Hence a refusal of repetition, of variation, of development, of contrast...all this I renounced when I began to work with 'pointillism.' Our own world—our own language—our own grammar: nothing neo-...! But then what? For me there followed *Kontra—Punkte*, a series of metamorphoses and renewals both deeply hidden and extremely apparent—tending to no visible end. Never is the same thing heard twice. Yet one has the clear feeling that an immutable and extremely homogeneous continuity is never abandoned. There is a hidden power of cohesion, a relatedness among the proportions: a structure. Not similar shapes in a changing light. Rather this: different shapes in a constant, all-permeating light. (In Wörner, 1973: p. 31)

Stockhausen's abstention from the traditional values of repetition, variation, development and contrast, will inevitably play havoc if an attempt is made to explain his music in terms of CTM, which, in varying degrees, presumes that the musical cognizing apparatus depends upon the processing of repeated elements (in a variety of appearances), and realizing said elements into hierarchically organized mental representations. If it is true that the cognizing apparatus operates in this manner, it will have to do so in stark contradiction to Stockhausen's compositional goal of 'continuous variation.' Lacking the epistemological base from which to grasp music in terms of the composer's design, the music cognizing mechanism (as described by CTM) stands in vain hope of apprehending Stockhausen's music as he intends it. In terms of the CTM paradigm, each listener's comprehension will then become dependent upon and relative to his/her own subjective construction of the music. Obviously, this is a very unsatisfactory situation, resulting in a potentially unremitting misrepresentation of the music.

Stockhausen's technique of 'general serialization' has three aspects worth considering. First, is the notion of 'total serial form,' which involves the equal participation of all elements and the mediation (through proportional series) of extremes. Second, is the notion of 'openended conception,' involving the dissolution of the hierarchy of principal and subordinate roles. Third, is the notion of 'relatedness of all to all,' which supersedes the contrasting of different characteristics of elements. It is important to note that these features of musical design create drastically different paradigms of musical thinking, when compared to the features of CPP music, especially in terms of the dissolution of the hierarchy of principal and subordinate roles, a factor upon which CTM depends heavily.

A summary of Stockhausen's typology of formal musical design reveals an innovative conceptual framework. At the elemental level are three types of formations: first, 'pointillist' formations; second, 'group' formations; and third, 'mass' formations. These elemental formations appear in three forms: first, 'determinate' form; second, 'variable' form; and third, 'polyvalent' form. Subsequently, these forms varyingly appear in three other types of forms: first, 'developmental' form; second, 'sequential' form (e.g., the classical suite); and third, 'moment' form.¹ These categories were developed by Stockhausen not only for his own music, but for others as well, in order to recognize the fundamental idea behind any given work as well as to identify the stylistic peculiarities of various composers.

It is pertinent to note that in his book, *The Thematic Process in Music* (1951), Rudolph Réti identifies the principal driving force in music from the Baroque period up to 1950 as being the notion of "theme as process." Traditionally, the appreciation and understanding of music both have been viewed as products of grasping thematic transformations and juxtapositions. By 1950, under the influence of Stockhausen and others, the notion of the centrality of thematic processes came to an end, and the focus shifted towards new, nonthematic musical shapes and processes. This development is significant for CTM. As noted throughout this study, the paradigm for musical analysis is the tonal-rhythmic pattern, typical of CPP music. With the advent of 'nonthematic' shapes and processes, new paradigms for cognitive analysis will have to be developed.

As previously noted, Stockhausen's compositional system grants equal participation to all musical parameters, including pitch, rhythm, dynamics and especially timbre. Electronic music has given twentieth-century composers the means to create timbres (and organize them in

^{1.} It should be noted that 'determinate' form, 'developmental' form and 'sequential' form are also dominant forms in traditional (CPP) music.

serial formation). The significance of this is that it permits timbre to function as an equal partner with the other musical domains (i.e., pitch, rhythm, etc.). For Stockhausen, a work is given unity through the formation of a single proportional series to be used in *all* domains throughout the work. Contrast is achieved by using a variety of proportions. In other words, a continuum of degrees of relatedness can be made between timbres (i.e., by means of a 'timbre continuum') through 'continuous formation.'

For CTM, Stockhausen's raising of timbre (and dynamics) to the status of structural element is problematic. L/J build their theory of hierarchical structuring on Schenker's which prioritizes tones and rhythms in the hierarchy, placing timbre and dynamics on lower levels. Fiske's notion of the P, P', Pn trichotomy effectively eliminates timbre from the processing picture, since patterns, by definition, are made up solely of tones and rhythms. Fiske's ontology of music designates timbre and dynamics as subsidiary elements. Said theories are in danger of accusations of ethnocentricity with their emphasis on CPP-based formal musical values, which limit discussion of the analytical structural hierarchy to tones and rhythms. If, in rebuttal, it is argued that the cognizing apparatus will continue to operate on T-R patterns in spite of the ideational framework Stockhausen's music represents, such arguments will require justification for that insistence. Otherwise, claims for cognitive universality in CTM will be severely impaired. In the next few paragraphs, I shall offer a summary of Stockhausen's model of general serialization.

Stockhausen's model of general serialization

Stockhausen's model consists of several principles, including the 'serialization of shapes and structures,' 'statistical formation,' the 'continuum of formal analysis,' 'relative variability,' the 'continuum of determinacy and indeterminacy,' 'pointillism,' 'serial formation' (special and general), the 'principle of reduction,' and 'grouping.' These elements will be described below. The model of general serialization is organized along a continuum. Listed below are the characteristics of the continuum:

Low <>High	
Homogeneous	Individual
Vast complexes	Isolated shapes
Quantitative	Qualitative
Impersonal	Personal
Background	Foreground

It should be emphasized that Stockhausen does not intend the elements listed above to be a listing of dichotomous opposites, where one characteristic in the continuum begins, the other must end, but rather is conceived as a processional concept, where one passes into the other.

The serialization of shapes and structures also occurs along a continuum. The graphic below illustrates the concept:

Shape <----> Structure

(Group)

(Mediating principle)

Unique, unrepeatable

Similarity, repeatability

(Form -groups of groups)

The next order of business is to describe each element in the general serialization model. In terms of the principle of 'statistical formation,' Stockhausen's procedure of analysis begins with a group of notes, which is first interpreted as the average of all the sounds that will occur in the composition. This method is contrasted with the traditional mode of analysis which begins with examinations of individual notes which eventually comprise a group. Stockhausen's method is unique in that it prescribes the individual note to be *subordinated* to the group, so listening becomes a matter of comprehending the *group* as primary, not the individual note.

This approach to analysis is well illustrated by Stockhausen's description of Debussy's Jeux, in which he states that "a crowd of notes rushes from the highest to the lowest register in a few seconds in the form of a shooting cascade. The ear grasps the complex as something that cannot be unravelled, whereas the eye discovers in the score that harmonic relationships exist within all the intervallic relationships" (In Wörner, 1973: p. 97). The reader should not be mislead into thinking that the principle of 'statistical formation' is something which evolved only in music of the twentieth century, because Stockhausen claims that similar comparisons can be made historically as far back as Beethoven. At any rate, the emphasis Stockhausen wishes to make is that 'statistical formation' is a procedure of analysis which springs from the group, in contrast to traditional analysis, which is derived from the single note and its function within the group. In 'statistical formation,' individual notes may be changed within a complex without altering the overall impression, whereas in the traditional analysis of melodic compositions, that is not possible without significantly altering the sense or the impression of the music (e.g., as a harmonic transformation, or as an alteration of a pattern). Stockhausen concludes that "the essential factors in statistical composition are how densely a given number of notes is presented, and whether the permutability relates to a very small area or a very large one" (In Wörner, 1973: p. 98). Consequently, as the mass of sound becomes more dense, the higher potential for the interchangeability of the notes increases without changing the overall impression. Stockhausen notes that "one cannot account for the whole on the basis of the individual part, for the whole is conceived as the probable result of many components" (Wörner, 1973: p. 98). Stockhausen borrows such terms from physics to describe these formal criteria as "spiral, centrifugal, perforated and exploding complexes" (In Wörner, 1973: p. 99).

Thus, even though each element in Stockhausen's compositional method is tightly controlled through serialization, an element of indeterminacy exists. However, unlike the brand of indeterminacy that is manifested in CPP music (exemplified by its permissible latitude in performance, restricted to tone colour, dynamics and/or tempo), indeterminacy in Stockh-

ausen's music extends to include the elements of pitch and rhythm (as well as tone colour, dynamics and/or tempo).

In *Klavierstuck X*, Stockhausen takes the notion of indeterminacy one conceptual step further. He mediates between extremes of organization (i.e., total determinacy) and lack of organization (i.e., total indeterminacy) by serializing the range *between* the extremes so that highly organized structures become highly individuated and structures of low organization become less differentiated, and move toward entropy.

This innovation in musical design impinges negatively on CTM because indeterminacy is said to be a matter of performative interpretation, not of compositional elements such as pitch and rhythm. Under the stipulations of the APV, the musical work is ontologically deemed to be a fixed object which is subject to a restricted level of interpretation. The rules of CPP music are strict in the sense that performative interpretation must not involve alterations of pitch and rhythm. In terms of CTM, no model described in this study is equipped to deal with indeterminacy outside the parameters of CPP performance practice. In a later section of this chapter, I shall explore other twentieth-century musical idioms which challenge the traditional (CPPbased) notion of indeterminacy. Let us continue with the presentation of Stockhausen's compositional approach.

Continuum of Formal Analysis

Stockhausen's system of 'formal analysis' runs along a continuum and is illustrated in the graphic below:

Pointillistic <	>Statistical
Transparent,	Crystallization into a
individuation of notes	unitary complex
Attention to:	Attention to:
-intervals, rhythms	-pitch direction (up, down)
	-rhythmic accel./decel.
	-density/transparency
	-timbre change/direction
	-intensity change/direction

<----->GROUPS----->

In Stockhausen's conceptual framework, 'groups' are understood in terms of their relationships to extremes. Therefore, proportional scales are set up to mediate these relationships. 'Groups' act as midway points in the continuum between the extremes of pointillistic individuation and the whole, unitary complex. Placed on the next higher level of comprehension/perception, 'groups' are defined as being on the next level up from the individual entities exemplified in individual notes.

The serial principle applied to single notes is correspondingly applied to 'groups, so that previously defined differentiations between individual notes now applies in equal force to relations between groups of notes. However, Stockhausen insists that the compositional process is not just a matter of juxtaposing and comparing contrasting groups of notes. He states that the process "entails putting things in relationships with each other. It involves the qualitative assessment of such quantities as intensity, duration, register, internal preponderance, and timbral preponderance: all these entail relationships which the composer has to weigh against each other" (In Wörner, 1973: p. 93).

For CTM, there is no explanatory mechanism in place to explain the cognition of the qualitative aspects of sound listed above. The explanation offered by L/J for such matters, as I have pointed out, is lacking in substance. In an alternative approach to music cognition theorizing, new paradigms which will include qualitative analysis will be necessary to account for such aspects. It is crucial to note that CTM's failure to explain such important elements of musical design is predominantly due to an undue reliance on the paradigms of CPP music. This failure must in turn call into question the central elements of theoretical design in CTM which are so dependent upon (and conceived within) the limited scope of CPP music.

Relative variability

In traditional practice, variation in dynamics and tempo are said to be proprietary to the interpreter. Stockhausen takes the element of performance interpretation out of the picture by stipulating performance variability in advance: that is, by deciding ahead of time the number of notes (or groups of notes) to be played within a specified time span. In this framework, it is the composer who defines the variability of interpretation, not the performer. The determinacyindeterminacy continuum is thus affected and controlled by the allowances for time, pitch, intensity, timbre designated by the composer. Consequently the notion, 'variability,' in Stockhausen's music, becomes another compositional parameter, in contrast to its traditional role as a subsidiary phenomenon particular to performative interpretation.

Performance variation as an element of indeterminacy is treated in CTM as a necessary evil in the sense that the cognizing mechanism is generally said to filter out performance variation and is not effected in its analysis of T-R patterns. In terms of this aspect of Stockhausen's conceptual framework, the cognizing mechanism will require certain ideational background in order to avoid misrepresenting the music.

Continuum of Determinacy/Indeterminacy

Stockhausen explores a way to organize material along a continuum in which on one side, determinate elements (or structures) are characterized by a high degree of differentiation (personalization, transparency) and on the other, chance (indeterminate) elements are characterized by a high degree of nonparticularity (interchangeability, opacity). Illustrated in the graphic below is Stockhausen's continuum of determinacy/indeterminacy:

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Indeterminate formation <-----> Determinate formation
-polyvalent, irregular, -fixed, regular, directional
interchangeable, non-directional
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According to Stockhausen, determinacy and indeterminacy are matters of perspective: that is, one can view composition in terms of relatively indeterminate, large numbers of notes, or one can view each note in relation to the form as a whole. Thus, whatever perspective taken by the listener alters the aural impression. Stockhausen notes that the perspective, not being fixed throughout the hearing of the piece, can range between the extremes of absolute determinacy and absolute indeterminacy.

As noted, the notion of indeterminacy is a sticky one for CTM, based as it is on the perceptual orientation of the APV. Fiske might defend his position that in such cases the P, P', Pn mechanism will produce a series of Pn decisions. However, that answer may be flawed because any Pn decision presumes, by definition, an earlier P decision. Since Stockhausen's design involves a range of determinate to indeterminate elements, there may be no sure means for the cognizing apparatus to fix upon an initial P decision.

Pointillistic music

Stockhausen's explanation of Messiaen's 4th Etude gives rise to the specifically musical use of the term, 'pointillism.' He states that

because we hear only single notes, which might exist for themselves alone, in a mosaic of sound; they exist among others in configurations which no longer destine them to become components of shapes which intermix and fuse in the traditional way; rather they are points amongst others, existing for themselves in complete freedom, and formulated individually and in considerable isolation from each other. Each note has a fixed register, and allows no other note within its preserve; each note has its own duration, its own pitch and its own accentuation. (In Wörner, 1973: p. 81).

Stockhausen traces the origins of pointillistic music to Debussy, who invented and developed it within the stipulations of the principle of 'continuous development.' Stockhausen states that the notion of musical pointillism developed from "a fundamental principle governing ratios and proportions [which] constantly creates new shapes; in the end, there will no longer be any formal repetition at all" (In Wörner, 1973: p. 82). Stockhausen traces the historical/developmental path of the notion of nonrepetition, beginning as pointillism, and eventually manifesting itself in serial form, from Debussy to Webern to Messiaen and finally to himself.

The notion of nonrepetition and isolation of tonal entities becomes problematic for CTM, and in particular, the 'rule management system' model. Under the conditions set by nonrepetition, the cognizing apparatus would theoretically be forced to make an infinite number of Pn decisions. Failing that, the mechanism would ultimately misinterpret conceptually individualized elements as falling into P or P' decisions. Either solution is unsatisfactory, because the mechanism is designed for pattern comparison, an activity which does not apply to Stockhausen's concept of pointillism. The traditional conceptual basis for analyzing tonal-rhythmic patterns (as stipulated in terms of the APV), operating without the benefit of such ideational frameworks, proves to be inadequate for the proper cognition of such music. I might add that said ideational frameworks become useful tools in the apprehension of music adhering to the 'continuous variation' paradigm. These ideational frameworks become part and parcel of an alternative (non-APV-based) conceptual framework theory of music cognition.

Serialization of the criteria of sound production in performance

The serialization of the criteria of sound production in performance involves performative elements such as durational decay values, timbral qualities and pedalling techniques of piano sounds (see *Klavierstücke*). Stockhausen states that "the scale of degrees of approximation, corresponding to the actual spacing of the notation, becomes one of the structural agents...experiential units of measurement—in contrast to the mechanical units of electronic composition—become serial components" (In Wörner, 1973: p. 34). Stockhausen speaks of a "new temporal relationship between performer and sound: the sounds' own time—yielded by a wide variety of signs for the pianist's actions—comes increasingly markedly to the fore in place of chronometrical or metrical time" (In Wörner, 1973: p. 35).

Spatial deployment of sound

This aspect of Stockhausen's musical design is best illustrated in his composition, *Gruppen*. The composer explains that "the spatial location from which the music is heard now becomes of importance in listening to instrumental music too: spatial deployment becomes functional" (In Wörner, 1973: 38). The listener, in the middle of the sounds, rather than in front of them, as in a traditional concert hall, experiences groups of sounds moving about, sometimes separating, sometimes crashing together. In Stockhausen's ideal concert hall, that kind of musical listening experience is possible. This idea harkens back to Varèse's notion of 'moving sonic masses.' I shall discuss this idea in the section reserved for Varèse.

In terms of the spatial elements of sound, an untutored listener can indeed be cognizant of this somewhat complex concept. This is an area that is virtually ignored in CTM. According to CTM, the cognizing apparatus interprets such factors as lower elements in the processing hierarchy. However, it is evident from the above description that a severe misrepresentation of the music would result. By basing the theoretical framework upon the T-R paradigm, this important element of music cognition is severely downplayed by CTM.

The relation between serial technique and serial thought

Stockhausen presents an interesting way to grapple with the problems connected with dichotomies of extremes, such as black and white, or sound and silence. He contends that

embracing the concept of 'serial thought' gives a listener the capacity to mediate between two auditory extremes, consequently providing one with the capacity to conceive of a scale of infinitely varying shades of auditory experience. Concerning this point, Stockhausen states that

here serial thought would be nothing more than setting up between black and white, according to the complexity of the proposed form, a scale having a sufficiently large number of degrees of grey, so that black appears not simply as an antithesis in direct contrast to white, but also as a degree of white itself, by virtue of the different values of grey in between. (In Wörner, 1973: p. 82)

A scale of gradations can be made to be continuous, as a glissando is a transition through infinite numbers of points, or it can be made to be discontinuous, with a set number of discrete points as in a scale. The number of points or degrees can then be pre-established in a particular order, creating the series, or row. Wörner explains that

by this means anything that is seemingly insusceptible to mediation in life, in nature, in art, or anything else, may be mediated. And in Stockhausen's view this concept, undermining as it does the dualism at the very fount of classical form, is a specifically modern idea. It entails a different attitude to life, bringing with it a new kind of formal thinking, whose beginnings were already present in instances as early as the work of Kandinsky, Klee, Joyce, Musil, Debussy, Schoenberg and Webern, amongst others. (Wörner, 1973: p. 83).

Thus, in art, the determinate proportions derived from the mediation of extremes give a work both its character and structure. Each part, though not equal in proportion to the whole, gets its due attention at the moment of its presentation.

Form and formation

Stockhausen refers to the notion of musical form not in terms of the traditional 'object' concept, but as "the state of a process of formation at any given point of observation, hence a momentaneous crystallization of form as a sample taken from a continuous process of becoming" (In Wörner, 1973: p. 85). Stockhausen applies the wider notion of 'formation' (as a process-concept) specifically to the notion of 'serial formation,' in its 'special' and 'general' versions.

Stockhausen defines 'special formation' as the formulation and the subsequent granting of equal participation to all aspects (parameters) of the sounds in a composition (e.g., duration, pitch, dynamics, timbre, spatial position, intensity). That is, each component of the sonic entity gets its own place in the formulation by a precompositional setting of all the parameters in the total sound. According to Stockhausen, this approach to serialization allows for much finer gradations in the ranges of parameters than in traditional (CPP-based) music, which only has about 90 notable pitches, 40 durations, 20 timbres (orchestral), and 6-7 notable dynamic degrees. Stockhausen states that in terms of the notion, 'general formation,' "the 'parameters' can be organized through one and the same principle, using a single series of proportions" (In Wörner, 1973: p. 88). With a view to establishing a scale of proportions, these parameters can then be used on a determinate basis to mediate between the extremes.

This level of detail does not consist in CTM, reliant as it is on CPP-based music. The various models examined in this study do not account for the detailing of parameters beyond the framework of the T-R pattern. This detailing is generally treated in CTM as 'nuance'; that is, as a subsidiary low-level analysis parameter and not as an integral formal musical feature, as Stockhausen suggests. CTM rejects the notion that timbre, according to Shepherd (1990), is the tactile core of sound. Perhaps the underlying reason for this omission on the part of CTM is in its implied dependency upon the features of Western notation for its theoretical parameters.

Principle of Reduction

Stockhausen takes a somewhat scientific orientation to the 'principle of reduction,' which follows an organizational plan of multiplicity into unity (which in itself is based on a prior assumption of unity). In terms of music, Stockhausen says that

the idea of a work comes from a basic consciousness of the organization of a community of notes. A work requires a homogeneity of elements and represents a form in which something happens between the elements which can again be seen and heard as a whole, in a higher unity. Yet the problem is always that we are representing and shaping quite new forms of thought and of life. This is what the artist accomplishes, as opposed to the natural scientist or the philosopher. The artist is in a position to *externalize his conception, to make it accessible to others in a form open to the perception of the senses*. Musical form is life—form, thought—form, made audible. (In Wörner, 1973: p. 89, my italics)

The key words in the above, "externalize his conception" and "make it accessible to others in a form open to the perception of the senses" might be interpreted in one sense as proving the APV hypothesis. I do not believe so, for the simple reason that the APV presumes a set of culture-

based listening conventions that do not exist for Stockhausen's music. Stockhausen's music (manifestly conceived) comes with an inherent ideational framework which in effect replaces (because of its newness) the lack of a set of time-worn listening conventions. I contend that all listening conventions by extension are essentially ideational. The complaint I have is that those who promote music cognition in terms of the APV deny the ideational side of musical listening conventions and by extension, deny it its rightful role in music cognition.

Electronic Music

Stockhausen insists that the selection and development of new and original timbres in music must be a priority. New sounds exhibit the personal quality of a work, whereas old or previously-used sounds are to be avoided. The originality of composers of electronic music is measured partly in terms of the uniqueness of the timbres in a work, in contrast to traditional (CPP) works in which thematic development is the accepted standard of ingenuity. As described above, many works of modern acoustic music are no longer assessed on thematic considerations, but on a multitude of other musical domains as well. In electronic music, total determinacy is a real possibility whereas in traditionally performed music there are unpredictabilities, but only through variance in interpretation. Stockhausen claims that indeterminacy can be brought back into the picture through technical means such as algorithmic random variation. Thus, the possibility exists for continual transformations of sound rather than traditionally conceived melodic and harmonic formulations. This results in an altering of the priority to the movement itself over that which is moved. New verbal imagery, which is more common to spatial imagery, has evolved for describing sound in such terms as 'nets,' 'grids,' 'webs,' 'splinters,' etc.

Descriptions of music in such terms, of course, violates the stipulations provided in the APV, because such terms are deemed to be referring to so-called 'nonmusical' entities. By consequence, such ideational items also violate the terms of CTM. However, since such so-called descriptive terms comprise aspects of the very conceptual fabric of the music of Stockhausen, there must be some way of accounting for them in a theory of music cognition, something that CTM systematically lacks.

The music of Stockhausen, although chronologically following Varèse, in fact owes much of its conceptual framework to the serialism of Schoenberg and the Second Viennese School. However, we have seen the folding together of the notions of serialism and sonic entities in his description of groups, which bear 'mass' characteristics but are at the same time serially conceived. In the next section, I explore the notion, 'sonic masses' as first conceived by Varèse. As with the previous sections, I shall offer a running commentary in order for the reader to understand my argument as it pertains to CTM in respect to aspects of the musical model.

9.3.2 The sonic entities paradigm

9.3.2a Varèse: musical sculpture and musical space

As much as Schoenberg looked to the past for his artistic motivation, Edgard Varèse looked to the future. Born and educated in Paris, he arrived in New York in 1915 with a prophetic vision for the future of twentieth-century art. Varèse stands apart from his contemporaries as one of the most original figures in twentieth-century music. Eric Salzman states that

the traditional idea of developmental process and variation plays virtually no role in his music, which is composed of planes and volumes...there is no sense of motion in the conventional sense at all but rather a play of kinetic and potential energies which give the impression of holding together complex, unyielding physical sound objects set, as it were, into a dynamic musical space. (Salzman, 1988: pp. 140-41)

Varèse turned away from a path of musical composition which followed a system or musical school of thought such as that of Stravinsky's 'neoclassicism' or Schoenberg's twelvetone technique. Varèse rejected the idea of adopting an extant system within which to compose, as a way to turn out a body of work, and often accused those who chose that route of a certain intellectual indolence. This resulted in the development of a new 'style,' if that is the correct term. That is not to say that Varèse rejected outright the notion of systematic organization as a viable approach to musical composition, because his work does in fact display a method. However, in order to understand Varèse's position on the issue (and to recognize that his writing is in fact methodical), a fine line has to be drawn between the notions of system and method. The secret to an understanding of Varèse's music requires a shift from the traditional preoccupation with the musical object to the idea of 'musical process.' This shift was borne of Varèse's commitment to what he called the "liberation of sound." His intention was to give music the same levels of freedom that had been and were being enjoyed at the time by the other arts. In describing his work, Varèse was often evasive and, according to Bernard, preferred to

speak analogically, not analytically, of his music, often with reference to physical phenomena. The analogy of crystallization, of crucial importance both to his aesthetic and to the invention of specific theoretical tools for his music, is a good example. (Bernard, 1987 : p. xix)

Varèse developed his concept of music from Hoenë Wronsky's statement that music is the "corporealization of the intelligence that is in sound" (Varèse, 1939, in Schwartz and Childs, 1967: p. 199). Defining music in this way builds in a strong descriptive component. However, I contend that analogical descriptions that refer to crystallization are no more or less descriptive than the term, 'melodic contour' which is often used in CTM. In other words, it seems inevitable that the language for describing music (scientifically or otherwise) derives it terms and categories from manifest views of the world, seemingly because the highly abstract nature of music makes it a requirement.

In the next few paragraphs, I shall outline some of the principal elements in Varèse's musical language, which include: (1) the concept of 'spatiality'; (2) the primary status of verticality over horizontality as the basis of structure; (3) the notion of 'form as process'; (4) the notion (from Cubist influences) of 'multiple viewpoints and simultaneity'; and (5) the primacy of timbre (and accent).

The concept of spatiality

Varèse explains the concept of 'spatiality' in music in the sense that sonic events which take place literally *in* the music are the result of a compositional process which involves the manipulation of materials within a spatial framework. He states that

when new instruments will allow me to write music as I conceive it, the movement of sound masses, of shifting planes, will be clearly perceived, taking the place of linear counterpoint. When these sound masses collide the phenomena of penetration or repulsion will seem to occur. Certain transmutations taking place on certain planes will seem to be projected onto other planes, moving at different speeds and at different angles...In the moving masses you would be conscious of their transmutations when they pass over different layers, when they penetrate certain opacities, or are dilated in certain rarefractions. (Varèse, 1967: p. 197)

Robert Erickson (1975) uses the term 'sound icons' to describe Varèse's concept of musical 'spatiality.' Varèse conceived of sounds as timbral entities which the listener could examine in different ways by alterations of entry and exit and dynamic fluctuation. The sounds, as they recur in varying settings, are themselves elevated to the status of separate entities, as opposed to the traditional view of being repetitions or variants of the same thing. Sounds are conceived as sculptured volumes of space which are perceived in terms of their relative opacity.

This notion is directly contradictory to Fiske's claim for the P,P', Pn trichotomy. That is, if Varèse's (manifestly described) notion of sculptured sound masses is understood as a central element of his musical language, there is a problem in reconciling that with Fiske's proposal that (in terms of the scientific view of music) said masses be explained away as variants of a T-R pattern. If the subjective construction paradigm is correct (which, in my view, is not), then sound masses would have to be taken as an ontological fantasy, manifestly *or* scientifically described. As with Stockhausen's indeterminacy scale, there is no sure route to establishing an initial P pattern for a sculptured sound mass. The cognizing apparatus may not, within the T-R paradigm, have the capacity to recognize sound masses as nothing more than a series of P decisions.

In describing *Intégrales* (1924), Varèse talks about his music as being "spatial," as "sound set free" yet "organized." He speaks of the entire composition as "a melodic totality," flowing "as a river flows" as the result of a continual process of expansion, interaction and transformation of layers of sound. Varèse compares the notion of 'form' to the phenomenon of crystallization, as "the result of a process" rather than "a mold to be filled." Scored for woodwinds, brass and percussion, *Intégrales* is conceived as 'spatial projection.' The composer describes the piece as "the projection of a geometrical figure on a plane moving in space, each with its own arbitrary and varying speeds of onward motion and rotation." Varèse says that he "planned it for certain acoustic media not yet available, but which I knew could be built and would be available" (All quotes in the paragraph above are from Chou Wen-chung, 1984). As a

composition about acoustic integration, that is, the interaction of all the sonic characteristics that can be practically isolated on conventional instruments, it anticipated the advent of electronic music.

The primary status of verticality over horizontality as the basis of structure

The idea of giving primary status to verticality over horizontality as the basis of structure is comparable to giving 'stasis' primacy over 'global movement.' That is, the primary elements in Varèse's music involve blocks of sound which move but do not blend with each other. For instance, Varèse understands the spacing of the notes of a chord to denote the size of the spatial sound mass and its distance from other sound masses. In this sense, Varèse was very interested in what other artforms could offer him to help conceptualize his musical language.

This flies directly in the face of the APV, which, by definition, prohibits so-called 'nonmusical' elements from being treated in terms of the apprehension of music. In terms of CTM, such thinking is decidedly regarded as 'nonmusical,' and thus is not considered an activity of music cognition. Yet, without such conceptualization, listeners would be at a loss as to the proper apprehension of Varèse's music.

Earle Brown was interested, in the 1950's, in the way Varèse explored 'time' in music in much the same way as Joyce, Stein and Woolf explored 'time' in literature. Joyce explored the depth, the density, the verticality of time as an opposing view to its traditionally conceived sequential (horizontal) passage. Stein maintained that there was no such thing as repetition, and Woolf was interested in slowing down the passage of time. Charles Wuorinen describes Varèse's contribution to a twentieth-century artistic view of 'time' as "his proposal to mark the passage of musical time by juxtapositional means rather than by a developmental one as from the past. The music proceeds according to the juxtaposition of differentiated elements, rather than the interconnection of evolutionarily related elements" (Ruth, 1978: p. 279). Varèse's compositions, *Octandre* (1923) and *Ionisation* (1929-31) succeed in this regard.

This approach to temporality is not generally dealt with in CTM. That may be because the conventional concept of time (especially in CPP music) is sequential. I think, though I may be wrong, that Varèse means for time to have *substance* and the substances (as blocks of sound) pass by or clash with one another in ways which do not exhibit the sequential passage of time. To illuminate this somewhat difficult concept, I offer Stephen Hawking's (1988) definition of space-time. He says that "the theory of relativity does, however, force us to change fundamentally our ideas of space and time. We must accept that time is not completely separate from and independent of space, but is combined with it to form an object called space-time" (Hawking, 1988: p. 23). Varèse's connections with the Futurist movement and his notions of tiem and space have significant resonance with Hawking's statements. CTM, however, with its traditional seqential notions of time, may not be equipped to handle Varèse's ideas of expanding and contracting spatial entities which in themselves may exhibit time itself. Although the parameters of this study do not permit an extended discussion in this area, I believe I have given sufficient evidence to demonstrate the shortcomings of CTM in this regard.

The notion of form as process

Varèse developed an innovative double concept of musical form in his notion of 'form as process.' He came upon this idea from the Futurists, in particular Boccioni, who spoke of two kinds of 'form as process': first, as 'form in movement', as action, in which the object itself moves in relation to other objects; and second, as 'movement of the form,' as transformation, in which the object itself moves in an absolute sense. In this way, objects define and are defined by space, and the form of objects is thought of as a 'resultant' of the process of action and transformation. (See Bernard, 1987: pp. 29-30).

Varèse used the analogic term, 'crystallization' to describe his notion of 'form as process.' He developed the idea from geology, in which crystallization is deemed to be a resultant rather than a prime-level, or atomic-level characteristic. Varèse states that in music "there is an idea, the basis of an internal structure, expanded and split into different shapes or groups of sound constantly changing in shape, direction, and speed, attracted and repulsed by various forces. The form of the work is the consequence of this interaction. Possible musical forms are as limitless as the exterior forms of crystals" (Varèse, 1967: p. 203). Sound, for Varèse (and for the Cubists, in terms of light), shapes the musical structure and is therefore intrinsic to it. This view is in stark contrast to the traditional (APV-based) view that content is separate from form. For CTM, the paradigm structures are T-R patterns. The sound itself (i.e., the timbre, the identifying quality) is deemed secondary and separate from the syntactic structure of the T-R pattern. For Varèse, however, form is the "resultant of a process" (i.e., crystallization) and as such, form is inseparable from content. Varèse justifies this claim because, as he states, his compositional process is not "the process of filling predetermined forms with motivic, thematic and harmonic material...[and that] inner [form] is different from outer in that, according to the crystallization analogy, the number of available internal structures is severely limited, while the number of possible external forms has no limit at all" (Bernard, 1987: p. 32).

The notion of 'form as process' involves four sub-elements. The first sub-element is 'sound projection,' described by Varèse as "the feeling that sound is leaving us with no hope of being reflected back, a feeling akin to that aroused by beams of light sent forth by a powerful searchlight" (Varèse, 1967: p. 197). Second, is 'rotation,' which Varèse says "implies a series of events in which the first causes one or more others to occur" (Bernard, 1987: p. 49). Varèse understands this as an aspect of spatiality in terms of its variegated perspective. In Octandre (1923), Varèse uses certain sonorities in repetition and juxtaposition with other sounds or sound complexes to give the impression of a 'viewing' of separate aural events from different angles. Ralph Shapey describes the notion of 'rotation' as if it evolves "from a network of relations that were changing, yet whose basic elements were always the same" (Ruth, 1978: p. 276). Brown speaks of the image of sculpture in Varèse's music to describe its static quality as a 'crystalline structure.' In describing this, Brown states that "the movement is there in an acoustic way, not in an aural or kinetic way; you can hear the sounds go across the orchestra" (In Ruth, 1978: p. 276). The third sub-element in the notion of 'form as process' is the contraction and expansion of densities of 'sound blocks.' The fourth sub-element is the notion that global processes are noncyclic and unidirectional. That is, global structure is not derived from identifiable pitch-class sets or tone rows, but rather from procedures that derive from connections made point-to-point. The idea of 'form as process' is linked to the Cubist notion of 'multiple viewpoints' and 'simultaneity,' described below.

The notion (from Cubist influences) of multiple viewpoints and simultaneity.

Varèse developed the notions of 'multiple viewpoints and simultaneity' from the Cubist art movement of the 1920's. In terms of the concept of 'multiple viewpoints,' the Cubists developed a technique in which the object of attention could be rotated (or could be viewed from different perspectives by moving around it), giving the sense of seeing it, in a single image, as a succession of moments, thereby reconstituting it into the medium of temporality. Varèse saw this as a way to create a bridge between the perception and conception of objects. Edward Fry explains that "conception makes us aware of the object in all its forms, and even makes us aware of objects we would not be able to see. 'I cannot see a chiliagon (a thousand-sided figure),' said Bossuet, 'but I can conceive it perfectly well'" (Fry, 1966: p. 95).

The concept of 'simultaneity' in terms of Cubist painting is perhaps best explained by Appolinaire. He states that in terms of

representing planes to denote volumes, Picasso gives an enumeration so complete and so decisive of the various elements which make up the object, that these do not take the shape of the object, thanks to the effort of the spectator, who is forced to see all the elements simultaneously just because of the way they have been arranged. (Appolinaire, 1913: p. 22)

Since the Cubists had found a solution for incorporating motion into painting through the division of discrete images in juxtaposition, the Futurists solved the problem by incorporating the idea of motion into a mix of other notions. The sculptor, Boccioni, incorporated spirals and other non-rigid profiles to capture the notion of 'continuity in motion.' Varèse was strongly attracted to the Futurist vision of 'simultaneity' and began using sirens in his early works (e.g., *Ionisation*, 1929-31) in order to overcome the conventional idea of discrete pitches, and also in order to cover the total pitch spectrum.²

It is in the rejection of the idea of working within a preconceived system that the Cubists founded their aesthetic point of view (broadly conceived). The arrangement of colours by themselves was thought to create a sense of movement and contrast, and the concept of viewing something from multiple perspectives simultaneously became closely allied with the use of colour as a means of contrast. For Varèse (in terms of the juxtaposition and the overlapping of sound masses in space), the idea of 'simultaneity' lent itself well to music. Varèse was aware of Henri Barzun's invention of so-called 'orchestral poetry,' in which several voices speak simultaneously. The idea of the layering of sound was said to represent a situation in day-to-day reality in which several speakers would be talking at once, with different shades of meaning emerging from different voices at different times.

Varèse's work, *Espace* (as a prime example of 'simultaneity') was intended to be broadcast simultaneously in several parts of the world in a crisscrossing mélange of sound masses. As Bernard explains, Varèse achieved, or at least endeavoured, within the limitations of conventional instruments, to achieve 'simultaneity' in the presentation of sound masses through the employment of two techniques. Bernard states that "one, [through] a high degree of timbre differentiation; the other, [through] rhythmic patterns that resisted the listener's attempt to mesh them" (Bernard, 1987: p. 16). Varèse often said that the element, 'simultaneity' would eventually be made possible later in life through the use of electronic techniques, which he eventually succeeded in achieving with *Poème Electronique* (1957-58).

The opening passages of *Intégrales* (1924-25) exemplify aurally the notion of 'simultaneity and multiple views' of a sonic object. Bernard describes *Intégrales* as a work "in which a succession of 'sound elements' (in the sense of pitch content and registral placement) is repeated some fourteen times before its dissolution, but never with an exact repetition of dynamic or rhythmic indication" (Bernard, 1987: p. 16). Gunther Schuller, in an interview with Varèse, referred to Varèse's use of sound masses as "the special kind of static continuity in

^{2.} Later, Varèse had the resources of electronic sound to capture the notion of 'simultaneity in motion.'

[the] music, and its use of repetition and near-repetition of the same elements in constantly new juxtapositions and successions" (Schuller, 1965: p. 36).

The primacy of timbre (and accent)

Varèse was the first composer to proclaim the primacy of timbre (and accent), and the subsequent assimilation of melody and harmony into them. Varèse treated the notion of timbre as a formal element of music. As discussed earlier, CTM rejects such elements as timbre (and dynamics) as formal elements. For instance, L/J treat timbre as a secondary element to be processed only after elements higher in the processing hierarchy (such as tonal and rhythmic patterns) have been processed. Varèse incorporated the notion of timbre as a formal musical element more due to his interest in the accomplishments of the painters and writers of his time than those of musicians. Early on, Varèse demonstrated an interest in the Cubists' use of colour and shadow as formal agents in creating contrasts in line and grouping of formal elements of the design. Regarding this, Varèse states that

the role of color or timbre would be completely changed from being incidental, anecdotal, sensual, or picturesque; it would become an agent of delineation, like the different colors on a map separating the different areas, and an integral part of form. These zones would be felt as isolated...These zones would be differentiated by various timbres or colors and different loudnesses...and would appear of different colors and magnitude. (Varèse, 1967: p. 197)

Bernard (1987) reminds us that Varèse was speaking partly theoretically at the time he came up with the above idea, in anticipation of the development of electronic means of realizing the formalization of timbre. Nevertheless, the importance Varèse placed on timbre was evidenced by his method of composing: that is, he was methodologically opposed to composing a piece by first writing a piano score and then orchestrating it. For Varèse, the uniting of the processes of orchestration and composition places the composer in a direct relation to the essence of the work because it allows him to work directly with timbre as the compositional process unfolds. According to Sperling, Varèse considered "orchestration [to be] the response to the musical content of the work" (Sperling, 1934: p. 128). The content is understood by Varèse to be the instrumental timbres.

Recall that Fiske defines musical content as the relation that emanates from the P/P'/Pn trichotomy. Timbre does not figure into the equation, because it cannot not, according to his stipulations, organized in terms of a tonal-rhythmic pattern. Fiske's very insistence on the tonal-rhythmic pattern as the paradigm element in music cognition points directly to its reliance on conventional approaches to music, putting in question the hypothesis in CTM for the universal-ity of cognitive processes.

In conclusion, Henry Cowell, the American composer, has said that Varèse may well be the only composer of music who was influenced by the aesthetics of the Futurist art movement, as led by artists such as Boccioni and Marinetti. As discussed earlier, the Futurists incorporated the concept of motion into the mix of the Cubist concepts of 'simultaneity and multiplicity of view.' The Futurists believed the Cubists' solution to 'multiplicity of view was somewhat impoverished since Cubist images remained discrete and static in their juxtapositions. Boccioni incorporated spirals and other nonrigid profiles in his sculpture to capture the notion of continuity in motion, images that Varèse incorporated into his sonic landscape.

The Futurists' work in the plastic arts led to some original conclusions about music. As explained above, he came to conceive of four dimensions in music: 'horizontality,' 'verticality,' 'dynamic expansion' (or 'contraction,' and 'extension' (or projection) into space. Varèse spoke of 'moving sound masses,' and claimed that "when these sound masses collide, the phenomena of penetration or repulsion will seem to occur" (Varèse, 1967: 197). The idea of sound projection is not unlike Boccioni's concept of 'dynamic continuity' or 'dynamic form,' which he defines as a "species of fourth dimension, both in painting and in sculpture, which cannot exist perfectly without the complete concurrence of those three dimensions which determine volume: height, width, depth" (Boccioni, "Plastic Dynamism" 1913. In Appollonio, 1973: p. 93).

CTM fails to provide the means to give a proper account for Varèse's music. If, as presumed in CTM, Varèse's compositions were in fact heard via the mechanisms of a naturalized form of the APV, most of his music would likely be cognized as unorganized noise. That situation would be likely because Varèse's music breaks the traditional paradigms of the melodic/harmonic/rhythmic frameworks of the CPP (from which CTM derives its musical paradigms) to such a degree that APV-based mechanisms (as described) can succeed to operate only with the smallest degree of success. That is why I contend that the ideational basis for apprehending Varèse's music is as much an integral part of the listening process as is the straight auditory experience of it. In the next section, I shall explore the ideational bases for the compositional approach of Iannis Xenakis. The ideational driving force behind Xenakis' compositions is motivated by Varèse's work with sonic masses.

9.3.2b Xenakis: stochastic mathematics

It is important to note that Iannis Xenakis, as well as being one the world's most prominent musicians, is also a professional engineer who worked with the famous architect, Le Corbusier. Xenakis' first large musical work, *Metastasis* (1954) is in fact based on the design for the surfaces of the Le Corbusier-created Philips pavilion built for the Brussels Exposition of 1958.

In his 1992 book, Formalized Music: thought and mathematics in composition, Xenakis sets out the principle features of his approach to musical composition. If one were to place Xenakis on a stylistic or conceptual map of twentieth-century musical thought, one would find him somewhere along the border between Varèse's territory of 'sonic entities' and the region of 'musical indeterminism.' The dual placement is necessary because in his musical design, Xenakis combined Varèse's notion of 'sonic entities' with a new exploration of indeterminism through such mathematical principles as Gaussian distribution (*ST/10, Atrées*, 1962), Markovian chains (*Analogiques*, 1958), game theory (*Duel*, 1959, *Strategie*, 1962) and stochastic mathematics (*Metastasis*, 1954).

The importance of Xenakis' orchestral piece, *Metastasis* is that it is the first musical work which makes use of the principles of stochastic mathematics such as those found in Poisson's law of the distribution of random events. The title itself sets the listener on the road to understanding something about the work. Metastasis is a combinatory form, derived from the Greek *meta* = after + *stasis* = stationary state, resulting in dialectical transformation. Xenakis composed the work in order to forge a link between classical music (including serial music) and what he calls 'Formalized Music.'

In *Metastasis*, Xenakis makes use of the calculus of probabilities, through massive continuous and discontinuous glissandi and pizzicati, striking of the wood of the bow to the string and other percussive sounds generated on the instruments. With a large number of sound points, distributed over the entire breadth of the sound spectrum, there appears in the acoustical array a dense 'granulation,' a veritable cloud of sonorous movement, all governed by the laws of stochastic mathematics. Xenakis' intent is to discover a new 'morphology' of sound, fascinating both for its abstract aspect (in terms of probabilistic theory) and for its concrete aspect in terms of the auditory sensation of previously unheard sonic materials.

Messiaen says of Xenakis' music that "the surprising thing is that the preliminary calculations are completely forgotten at audition. There is cerebral quality, no intellectual frenzy. The result in sound is a delicately poetic calm or violently brutal agitation, as the case may be" (In Claude Rostand, 1969). I interpret Messiaen to mean that the theoretical (i.e., mathematical) underlay of the piece, while not affecting audition directly, somehow exerts an influence on a listener's perception of the music. However, without a conceptual 'lifeline' to perception, *Metastasis* may only ever just sound like disorganized noise to the average and uninstructed listener. Nevertheless, it is important to note that the aesthetics of the twentieth century both permits and encourages a partnership of the participant's conceptual and the perceptual powers in the apprehension of art.

Under the stipulations of L/J's 'generative musical grammar' model, Messiaen would certainly qualify as a so-called 'expert listener.' To a lay listener, who presumably (on L/J's account) would employ the *same* mental processes for comprehending music as would a composer such as Messiaen, I contend that a full and enriched understanding and appreciation of *Metastasis* might be impossible solely within the auditory-cognitive domain. I would argue strongly against the APV-based paradigm of CTM, that without some help on a conceptual

level, the apprehension of a piece which has the complexity and apparent density of *Metastasis* may only be partly comprehended or even completely miscomprehended.

In setting the background for a discussion concerning indeterminacy, Xenakis summarizes the standard dichotomies, pure chance and pure determinism, that have existed since antiquity. Xenakis contends that in recent times, knowledge has been seen as the explainer of the notion of the progressive degrees of chance, without fully explaining the notion of pure chance itself. In noting that the concept of causality has been central to Western thought since antiquity, Xenakis conceives what he calls the 'principle of causality in music' as a *historical* process (and not an ontological matter, as presumed in CTM). Influenced by Pythagoras and Plato, Xenakis states that it was believed that nothing comes into being without cause. According to Xenakis, the notion of causality has been reflected in musical design right up to the end of the CPP. The tonal system, with its hierarchy of tonal functioning (i.e., tonic, subdominant, dominant, etc.) is exemplary of the strictness of the notion of causality in musical design.

Xenakis pinpoints the historical end of the notion of strict causality in physics (at the end of the nineteenth century) as coinciding with the rise in the development of statistical theories in physics. It is perhaps not coincidental that in the early twentieth century, with the formation of the Second Viennese School (around 1915), the rise of strict serial atonality broke the grip of functional determinacy held by the tonal system, but replaced it with its own brand of determinism in the form of twelve-tone serial technique. Xenakis speculates that the early atonal composers did not have an idea how to deal with atonality in a chance setting. A complete solution was not found, but eventually a partial solution is found in Messiaen's system of 'multiseriality.'

Recall that in the early twentieth century, musical composition was split into two general camps, with the borders somewhat blurred between them. First, was the 'proto-tonality' (i.e., atonal) camp beginning with Schoenberg, leading to Messiaen, and culminating in 1950's neo-seriality. The other musical camp, including Varèse and Xenakis, works with the notion of 'sonic entities.' Stockhausen's system of 'general seriality,' was somehow prototypical of serialism as

a technique of organization but incorporated the notion of 'sonic entities' into its realization of musical form.

In 1954, with the work of Xenakis, serialism was eventually replaced by music based on the statistical processes of stochastic mathematics. 'Stochastic music' is generally defined as "involving randomly determined sequences of observations each of which is considered as a sample of one element from a probability distribution. Stochastic music relied upon a more general theory of causality, of which serialism became a particular case. Stochastic variation implies randomness as opposed to a fixed rule or relation in passing from one observation to the next in order" (The Random House Dictionary of the English Language). 'Stochastic music' follows mathematical progressions (or transformations) from complete order to complete disorder in continuous or discontinuous manner. 'Continuous' (or 'discontinuous') transformation is realized musically in passages of discrete but short glissandi or string pizzicati in multitudinous fashion. This type of sound structure gives the aural impression of continuity or discontinuity and can be controlled through probability theory.

Another area in which stochastics is of use in music is in the exploration of total asymmetry in rhythmic variation and the total negation of durational causality between sonic points. For instance, the laws of stochastics can be used in calculating the frequency of the clicks of a Geiger counter, or the frequency of raindrops falling on a tin roof, or the frequency of the chirping of cicadas on a summer night. Stochastic laws also provide a determinism of the probabilities of the essential components of sound. Durations are calculated as the linear density of points in a time continuum. Xenakis states that clusters of sounds in a time-space are defined in terms of stochastics as a "set of sound-points in the intensity—pitch space realized during a given duration" (Xenakis, 1992: p. 77). Speeds of glissandi, in stochastic language, are thought of as vectors, as continuously or discontinuously variable speeds of pitch change.

Thus, the individual sound in 'stochastic music' loses its importance, with the consequence that the ensemble of sounds is perceived en bloc, as a whole. The ambition of the composer is to discover a new 'morphology' of sound, fascinating both for its abstract aspect (by means of probabilistic theory) and its concrete aspect through the sensation of previously unheard sonic materials.

Although the mathematical underlay is not essential for listening to a work such as *Metastasis*, it does serve to index it historically and culturally, just as Wagner's extended use of the diminished seventh chord (in the *Prelude to Tristan and Isolde*) indexes the piece as a work of late nineteenth-century European chromaticism. However, that is not my central point here. My point has to do with the inadequacy of CTM to explain the necessity of an epistemological base for apprehending such music. That is, if the cognizing apparatus has the presumed capacity to concentrate only on local data as a starting point in the hierarchical listening process (as in Fiske's design, with its focus on the P, P', Pn trichotomy), the point of such music will be lost from the outset. For Xenakis, the detailed sounds of the individual glissandi of the potential 60-65 string players in a symphonic orchestra have the same sonic effect as the visual effect of individual droplets that spread out when one tosses a bucket of water—that is, it is the wholeness of the spray that is the central aesthetic effect, not the individual droplets. One might even conceptualize the wash of glissandi as a kind of 'musical spray,' a notion which adds immeasurable depth to an otherwise purely APV-based experience of the music.

Since Xenakis is primarily concerned (as is Varèse) with volumes and densities of sound, the conceptual framework for listening to their music requires a drastic alteration from listening habits which search for melodies, harmonies and rhythms in CPP-ordained orders. However, since CTM denies a place in theoretical design for a conceptual framework for listening (because it is outside the parameters of the APV), there is little chance that the idealized listener's music cognizing apparatus, operating under such conditions, will apprehend the intended realities of Xenakis' and Varèse's music, resulting in a severe impoverishment of the listening experience.

In the next section, I shall explore the notion of 'aleatory,' as one of the defining features of twentieth-century music. Again, as with previous sections, I shall offer a running commentary in order for the reader to understand my argument as it pertains to my critical analysis of CTM.
9.3.3 Anti-rationality, indeterminacy and aleatory

There is a dual link between the super-rational, totally organized music of Stockhausen and the abandonment of composer control that is emblematic of John Cage's music. First, the two compositional movements were historically coincidental and second, they were both not at the beginnings of a historical development, but rather at the end. In point of fact, Stockhausen comes at the end of a long period of an increasing rational control over musical materials, which began in the eighteenth century, or even earlier. Cage's music comes out of the Ives-Cowell line, with its preoccupation with non-tempered sounds, percussion, and with Oriental ideas. Eric Salzman states that

eventually Cage abandoned not only steady-state pitch phenomena but also rational control over many aspects of the musical event. He threw dice, used the *I Ching*, plotted star charts or the imperfections on a piece of paper—not to give the performers freedom, but to de-control the conscious manipulation of sound. (Salzman, 1988: pp. 159-60)³

Cage produced tape collages (see esp. *Imaginary Landscape No.* 4, 1951, for twelve radios, and random noise assemblages) in which, within a fixed time span, any aural objects (including other music) come together in any combination, occurring as random events taken from the real world and put into random juxtaposition. For live performances, Cage employed fixed time segments, and graphic or schematic notations, which Salzman explains are

basically programs for activities, they renounce any specific control of actual sound results but merely define the limits of choice and possible field of activity, and quite explicitly show the impossibility of prediction...The graphic representation becomes partly an end in itself, a significant catalyst in an ongoing relationship between creator, performer, and listener. (Salzman, 1988: p. 160)

The last sentence in the quote above is of particular interest to this study. As discussed earlier,

it is a central presumption of the APV (and consequently of CTM) that the respective relation-

ships of creator, performer and listener to music are of persons to an aesthetic object. I shall

^{3.} The Latin word, *alea*, meaning dice, is the root for the term, 'musical aleatory,' describing types of music that employ chance elements, randomness, and indeterminacy in the realization of performance. Sometimes the term used is 'aleatoric,' which is criticized by those who argue that 'aleatory' is itself adjectival, being a derivation of the French, *aleatoire*, meaning 'chancy' or 'risky.'

argue in Chapter 10 that in essence, the view taken by music cognition theory is that the relation between listener and music is an object-to-object relation. With 'aleatoric music,' this presumed relationship loses much of its footing. Salzman goes on to say that "musical performance becomes a kind of existentialist activity in which the notions of 'musical composition,' of 'performance,' of 'communication,' and of the 'work of art' itself are destroyed or drastically altered; in which the listener becomes directly involved in an activity in which the old distinctions and relationships are meaningless" (Salzman, 1988: p. 160). In the next few paragraphs, I shall attempt to sort out Salzman's point. In doing so, I hope to open a discussion on what effect aleatory has on the notion of musical participation.

Salzman's suggestion for the direct involvement of the listener with the activity is due, in my view, to an alteration that has been created by 'musical aleatory' in terms of the traditional relation between performer and music. Salzman notes that "an obvious corollary to the derationalization of composer control was the increased importance given to the performer's role in determining the details or the actual shape of a conception in performance" (Salzman, 1988: p. 161). For the performer, the traditional distinction between creator and re-creator becomes altered because, in 'musical aleatory,' the performer's choices in performance become as much a part of the 'composition' as are the range of choices set by the composer.

Salzman notes that "it is important not to confuse this music with improvisation; there is no question here of performance tradition or spontaneous invention within some given pattern but only controlled-choice situations in which any rational basis for decision has been intentionally removed or minimized" (Salzman, 1988: p. 161). In terms of CTM, the general approach to improvisation is to treat it as a 'variations' version of pre-composed music, because the point of view is stipulated to remain the same: that is, from an APV-based listener orientation. 'Musical aleatory,' however, shifts the orientation to an active one in which the performer makes choices as to the structure of the composition. An alternative model for music cognition has the task of explaining the new orientations to music-making as an active process. This brings us back to the relationship of the listener to the activity. The activity (i.e., the performance) is no longer simply a 'realization' (traditionally conceived) of the reified choices of a composer (in the form of a 'piece,' a.k.a., aesthetic object), but is a curious blend of the performer's personality and the choices being made in performance. The question then arises as to what the listener is actually relating to: is it the performer (as a person making choices about musical content), the choices themselves, the aleatoric situation (i.e., the musical composition) originally created by the composer, or some mixture of all the above possibilities? I tend to lean toward the latter possibility.

With aleatory, the newly instantiated relationship of the listener to the activity alters the previous traditional distinction-making possibilities between performer, activity and aesthetic object. In other words, with aleatory, there is no longer a clear distinction between the performer and the music being performed (expressed as an APV-based musical 'object'). That which the performer brings to the music is now as much a part of the music as the music she creates. With aleatory, the music ceases to be a reification of a composer's choices, but rather becomes a process of dynamics between the performer and the set of choices being made.

With this new situation, the aesthetic object no longer occupies its traditional role in relation to the listener. The traditionally conceived action of participating in music (i.e., listening to a performer perform music) now becomes an intersubjective activity which permits many of the dynamic possibilities that intersubjective activity permits when two persons interact in terms of a specific subject matter. With aleatory, therefore, music cognition is no longer a product of mental processes created by a cognizing apparatus encountering an aesthetic object, but is rather a dynamic in itself, that is, an intersubjective activity of participants who are concerned with a subject matter that is called 'music.' It then becomes less of a concern whether the subject matter (i.e., music) is conceived as an object *or* an activity. That is, because with aleatory, music is conceived more as a social construction that arises from the intersubjective dynamics over a given content that is agreed upon between or among participants. Ultimately, the interaction among performers and other performers, among performers and listeners, or even

among listeners and other listeners that exists among all the possible situations in aleatory, may be reducible to a situation in which there is no need for so-called 'musical' activity at all.

A good example of the above is in Cage's famous work, 4' 33" (1952), which he intended to be apprehended as providing a spatial and temporal frame for environmental sounds. Salzman describes 4' 33" as "a segment of time isolated and defined in order to trap, for a moment, the experience of the haphazard, 'real' world. Or it may be taken as the zero point of perception where total randomness and aleatory meet total determinism and unity in the literal experience of nothing" (Salzman, 1988: p. 160). Essentially, one might think of 4' 33" as the ultimate paradigm of the notion of 'form,' which Cage defines as "the morphology of a continuity" (Cage, 1961: p. 18). Nothing of the materials (i.e., occurrences) which were to be contained in 4' 33" determines its structure. That is, the structure of 4' 33" is as unaffected by the presence of occurrences as it is by their absence. Cook takes Cage seriously on this point, which explains his comment that in Cage's aesthetic framework,

anything can be heard as music, Cage is saying, if the listener chooses to hear it that way. From this point of view, composing music becomes not so much a matter of designing musically interesting sounds as such, as of creating contexts in which sounds will heard as musically interesting ... listeners (of pop music, or avant-garde music) it seems, will tacitly accept virtually any sound as being potentially musical, provided that it appears in an appropriate context. (Cook, 1990: p. 12)

For those who rail against the notion that 4' 33" is 'music,' I would caution them against being too overly influenced by the APV, which makes the aesthetic object a necessary component of a definition of 'music.' It is evident that 4' 33" is not a piece of music in the ordinary sense, and neither is John Cage a composer or creator in the ordinary sense. As Salzman states, Cage questions and makes irrelevant the whole question of order and rationality in performed music. However, Salzman argues that "it is in the nature of human activity that a precise action can never be repeated and that no event can ever recur; it seemed logical, particularly to the European dialectical mind, that irrationality and randomness should be built in as qualifications for the construction of a new instrumental and performed music" (Salzman, 1988: p. 161). Salzman correctly argues that randomness and irrationality are probably no more or less essential to the human condition than the capacity to impose order and rationality on the external world. As indicated earlier, Xenakis shows that when true randomness is desired, it is best done by a computer, such as when statistical random patterns are needed to indicate a spray of events over a given field, which are then translated into sonic values. Cage achieves randomness by incorporating the events of a manifest-world situation within the restrictions of his own temporal morphology.

On the other hand, in Morton Feldman's music, the traditional premises concerning the relational organization of sounds are reversed. Sounds are not organized in relation to each other, but are conceived as isolated events, dissociated from each other, resulting in a novel sense of time not previously experienced in Western music. In terms of Cage's approach, Salzman states that

in many Cageian and post-Cageian works, there is a set of activities regulated by a set of limitations, often with a an intentional disassociation between the nature of the activity and its possible results in sound. Instead of being conceived as sound, performances may be based on visual definitions, programs of activity, ideas of non-sound or silence. Instead of defining time, the compositions are themselves defined by the random passage of time, extending to indeterminate or theoretically infinite length. Instead of a music of definable identity, we have conceptions whose essence is lack of identity. (Salzman, 1988: p. 163)

In the final analysis, Cage will probably not be remembered so much for his work in musical indeterminacy, but rather for his philosophical position which occupies the dialectical opposite side of that represented by serialism: that is, in terms of the total internal order of a composition and in terms of the total determinism of style. Salzman argues that it is Cage's "conception of art as a human activity and his opening up of the external universe as subject matter for an art that had become almost entirely interiorized [that] will stand up as his major contributions" (Salzman, 1988: p. 163). We might understand Cage to represent the end of the period of musical Modernism. From that point of view, 4' 33" might well be considered to be the zero starting-point in the post-Modern era.

9.4 Conclusion

The essential point of this chapter has been to provide strong grounds for placing the APV in a historical and cultural context which finds little relevancy in the twentieth-century avant-garde. During this period, the dialectical notions of rationality and irrationality in music have been exposed and challenged, but wherever the pendulum has swung in this latter stage of the century, it must be taken as a reflection of historical and cultural forces.

The conceptual framework for the proper apprehension of twentieth-century music does not make a good fit with CTM. I have shown this to be principally due an adherence to and subsequent naturalizing of the APV in formulating music cognition theory. I have shown that the perceptual base for cognition, expressed as exclusive to the auditory-cognitive domain, is insufficient for dealing with ideationally conceived art. Even though music may always have a sonic component, I contend that the perception and subsequent cognition of that component must always depend upon a conceptual listening framework for a proper apprehension of music. As well, I have been careful throughout this chapter to avoid speaking of music solely in an object sense, and have indicated that music as a process has as much validity. I shall have more to say concerning that point in Chapter 10.

Music as Cultural Construction

10.1 Introduction

As stated throughout this study, the central flaw in CTM is that theoretical models are constructed upon postulated structures and processes which limited their descriptions to the auditory-cognitive domain. My objection to the above is that the unmediated listening act presents only a partial picture of how humans come to participate in music. Concerning this point, Binkley states that "art is too culturally dependent to survive in the mere appearance of things" (Binkley, 1987: p. 92). To talk about music aesthetically (that is, in terms of the APV) is to talk about music as a set of musical objects and to define music in terms of such a conceptual framework is to explain it in terms of membership in a class of aesthetic objects called 'musical works.' Thus, we often find aesthetic discussions centering on the question, "What is music?" immediately turning to focus on the question, "What is a work of musical art?" as though the two questions were completely interchangeable. However, the two questions are not really about the same thing. Binkley states that "what counts as a work of art must be discovered by examining the practice of art. Art, like philosophy, is a cultural phenomenon, and any particular work of art must rely heavily upon its artistic and cultural context in communicating its meaning" (Binkley, 1987: p. 90). He further states that one "cannot explain the meaning of a painting [or a piece of music] without viewing it immersed in an artistic milieu" (Binkley, 1987: p. 90).

Binkley states that trying to identify 'art' by defining it as a collection of 'works of art'

is a bit like trying to define philosophy by saying what constitutes a philosophy book. A work of art cannot stand alone as a member of a set. Set membership is not the structure of that human activity called art. To suppose we can examine the problem of defining art by trying to explain membership in a class of entities is simply a prejudice of aesthetics, which underplays the cultural structure of art for the sake of pursuing perceptual objects. (Binkley, 1987: p. 90)

Binkley goes on to say that a paradigmatic work of art like the *Mona Lisa* is "a thoroughly cultural entity whose artistic and aesthetic meanings adhere to the painting by cultural forces, not by the chemical forces which keep the painting intact for a period of time" (Binkley, 1987: p. 90). This can equally be said for musical works, which are not simply compilations of sounds. Therefore, for reasons similar to those suggested by Binkley, the physical forces in sound cannot supply a sufficiency of artistic and aesthetic meanings to create a proper picture of what it is to cognize music.

The above paragraphs set the stage for my positive thesis on which to formulate a reconceptualized music cognition theory. My intent in Chapter 9 is to reveal the strong need for a wider conceptual framework in which to begin to formulate a model of music cognition theory which will take into account a range of approaches as to how humans participate in music. My intention in this chapter is to focus upon several areas which deserve attention in terms of the development of an alternative conceptual framework for music cognition theory, taking into account the view that music is primarily a manifestation of culture, and that individuals receive and create their musical culture in terms of an interaction of persons.

10.2 Rationality and intuitive experience

As stated throughout this study, CTM takes an unacceptably narrow view of musical experience, namely that which emanates from the intuitions arising from auditory-cognitive experience. Nicholas Cook (1990) argues that the experience of music actually has two sides: first, one which is experiential, relating to musical, intuitive judgments; and second, one which provides or seeks rational explanation for musical events, at times relating to verbal and/or logical factors. In his book, *Music, Imagination, and Culture*, Cook looks for some of the discrepancies between the way music is explained and the way it is experienced. He argues that it is not that musicians are at fault in the way they describe music, but that descriptions of music by musicians necessarily have to be done within a musical culture, "which is to say that they are operating within a framework of suppositions or (if you like) prejudices that constitutes a culture" (Cook, 1990: p. 3). He contends that the activities of theorizing, criticism,

describing, etc., are somehow integral parts of the musical production process, and by extension, also integral parts of the experience of music.

I wish to draw a comparison between Cook's phrase, "framework of suppositions that constitutes a culture" and a term used throughout this study, the "manifest view of music-in-the-world." Both notions constitute an expression of how music is experienced in terms of its day-to-day existence, as a thing or activity that humans encounter in the 'lived' (i.e., manifest) world. Cook sets forth the proposition that "a musical culture is, in essence, a repertoire of means for imagining music; it is the specific pattern of divergences between the experience of music on the one hand, and the images by means of which it is represented on the other, that gives a musical culture its identity" (Cook, 1990: p. 4). In other words, the manifest view of music is the way music is experienced, in terms of the activities of imagining, representing, interpreting, etc., by an individual or group of individuals in a given culture. Cook contends that a musical culture makes interpretations within a "specific cultural and aesthetic stance; and any aesthetic interpretation takes certain beliefs or interests for granted, simply by virtue of being an aesthetic interpretation" (Cook, 1990: p. 4).

The above point is interesting for this study, because Cook embraces the dual notions of 'culture' and 'aesthetic stance' as having composite roles in musical experience, and that aesthetic experience has embedded in it certain beliefs and interests which arise from culture. As such, aesthetic experience is interpreted *in terms of* the culture from which it arises. In the more specific terms of this study, I take the above to imply that the cognition of music is achieved within the framework of the culture from which it arises. In short, I conclude that the aesthetic experience (broadly conceived) of individuals supervenes on the culture (which comprises the beliefs and interests of a particular group, manifestly conceived) in which they live.

Recall that Baumgarten's *Aesthetica* (1750) argues for the cognitive status of sensory perception, not as a means to the acquisition of knowledge, but as a type of knowledge in of itself, so that aesthetic perception in all its multiplicity and variety, is seen as being complete

and indivisible. On this view, Baumgarten marks perception out as being 'aesthetic.' Cook notes that "in this way the idea that to perceive something aesthetically is to perceive it as an integrated whole is axiomatic to the entire enterprise of aesthetics" (Cook, 1990: p. 5). Also recall Dahlhaus' comment that "the notion of the whole is one of the few to survive intact the transformation of esthetics from a theory of perception to metaphysics and on to psychology" (Dahlhaus,1982: p. 6). These two quotes outline precisely the aesthetic argument, that aesthetic experience arises solely from perceptual experience and remains intact as an indivisible entity. Cook puts the aesthetic argument (narrowly conceived) in an interesting perspective. He states that "the structural wholeness of musical works should be seen as a *metaphorical* construction, rather than as directly corresponding to anything that is real in a perceptual sense; but I take for granted an even more fundamental assumption of the aesthetics of music, namely that the significance of music lies in what we perceive as we listen to it" (Cook, 1990: p. 5, my italics).

If the structural wholeness of musical works is better understood as 'metaphorical construction,' I contend that it is because descriptions of musical experience can *only* be so. I argue that that is due to the difficulty of offering a description of musical experience just in terms of the experience itself. Therefore, and for the same reasons, it also stands that descriptions of the cognitive structures which may arise from musical perception must also be described metaphorically. I contend that this is so because such descriptions have to be made in terms of the manifest image of music, not in terms of hypothesized cognitive structures, because nobody can accurately describe something that is inherently and definitively cognitively inaccessible. In other words, such descriptions depend on and take their terminology from the everyday (i.e., manifest) experience of music in the context of the culture of the person doing the describing. Thus, the question arises whether the descriptions of music cognition provided by CTM are not simply products of a particular cultural view. I would argue in the affirmative because I contend that persons must by force describe their world through their own cultural filters.

Recall my earlier statement that Western culture generally regards music as a sonic phenomenon. As a counter-example, I mentioned African kalimba (thumb piano) music, in which music is viewed in kinaesthetic terms—that is, by the patterns of fingering rather than the resultant sounds. I also mentioned Chinese qin (zither) music in which a complex appreciation (in knowledgeable players and connoisseurs alike) arises from the separation of the hand motions from the sonic aspects of the performance. Cook says that we in Western culture tend to rationalize the sounds of music and how they are experienced. He contends that as a culture, however, we are not prone to rationalizing their "physiological, psychological, affective, moral, or social consequences in the same way," and that we, as members of a culture "are not in the habit of thinking reflectively about them" (Cook, 1990: p. 5).¹ As a consequence, especially in terms of the experience of such music as *kalimba* or *qin*, we as members of Western culture (which focusses so heavily on the auditory experience of music) are potentially locked in a state of misrepresentation concerning the experience of music from other cultures if those cultures do not in fact maintain similar standards of judgment as our own. To forestall potential misrepresentation, non-APV based factors must be permitted to contribute in the comprehension of such music.

However, Alan Durant, in his 1984 book, *Conditions of Music*, maintains that a Western listener, in terms of his/her experience of music having an unfamiliar social function, typically has a uniquely "Western" (i.e., APV-based) experience of it, no matter how much study is made of the social function of the music. He claims that even if a listener were knowledgeable concerning cultural factors surrounding a particular musical idiom, "what is gained is in no way the restoration of an original, fundamentally social experience of ritual or assembly. On the contrary, what is produced is an importantly new (in this case 'original') phenomenon of representation, in the projection—frequently for private, domestic consumption—of scale, ambience of ceremony, or mass performance" (Alan Durant, 1984: p. 5). In other words, some

^{1.} I shall have more to say about this point shortly.

brand new type of experience arises, which involves a new dynamic between the listener's own culture and his newly acquired epistemological basis for listening.

Another way of stating the above might be that Westerners' experience of music from Western and from other cultures supervenes on Western beliefs about music itself. Thus, Cook argues that "to approach music aesthetically—to interpret it in terms of a specific interest in sound and its perceptual experience—is not, then, to transcend Western cultural values, but rather to express them" (Cook, 1990: p. 7). However, regarding any type of musical experience from that of hearing avant-garde music in a concert hall to hearing Mozart in a supermarket, Cook contends that for Western listeners "it is the circumstances of listening rather than the sounds themselves that are decisive in determining the listener's response" (Cook, 1990: p. 13).

That brings us back to Garfield's claim that cognition supervenes not on the scientifically described mind/brain, but rather on a large and irregular environment in which the individual lives. Therefore, the difficult but necessary task for future music cognition theory will be to provide a convincing explanation of the experience of music in terms of the context of that large and irregular environment. From the APV, the matter is simplified by eliminating the contextual, historical or cultural factors from explanations and/or descriptions of the experience, because the context is presumed not to affect the experience—in fact, it impedes it. By extension, explanations and/or descriptions of the experience of music made in terms of the processes and products of cognition (also formulated in terms of the APV) do a similar job by eliminating so-called 'nonmusical' factors from consideration. However, I contend that there is ample reason to refute such reductive approaches. To that end, I shall begin by devoting the next few paragraphs to the issues connected with defining the notion, 'perception.' Cook and Roger Scruton make strong implications that there is more to the story of perception than describing it in terms of straight stimulus response.

10.3 Defining perception

I contend (contrary to cognitivist theorists such as Serafine or Fiske) that there is a cognitive component to perception. I also argue that the very act of perception requires a prior development of a conceptual framework appropriate to 'making sense' of the world. Cook states that

philosophers sometimes reserve the term "perception" for a direct, sensory response to a stimulus, referring to any higher-level, interpretive response as a "cognitive" one. But this distinction has been undermined by the realization that almost all perceptual responses are to some degree interpretive (i.e. involve perceptual construction)...What becomes important, then, is to distinguish between the different kinds of perception involved in music and the extent to which they can be affected by critical interpretation or reflection. (Cook, 1990: p. 19, his parentheses)²

Scruton (1979) develops a theory of perception which carves a distinction between what

Cook calls "literal perception on the one hand, which aims at the factual identity of objects, and imaginative perception on the other, which involves voluntary interpretation" (Cook, 1990: p. 19). Scruton sheds some light on the notion of 'active perception,' or 'imaginative perception' when he states that 'imaginative perception' is a "kind of synthesis between sensory perception and rational interpretation" (In Cook, 1990: p. 20). Thus, the act of perception is understood by Scruton to involve experiencing the object of perception directly, but also involves the interpretation of the object of perception in terms of something other than the thing itself, such as a geometrical form, or a moral, historical or spiritual statement. Scruton says that

to be active, a perception must exhibit that kind of conscious participation that is involved in the perception of an aspect: it must involve an engagement of attention, an interest in surface, a transference of concepts from sphere to sphere (as in metaphor); in the limiting case it may itself be a voluntary act. All those features of "activity" are exhibited in the perception of musical movement. The voluntary character of this perception provides one of the foundations for structural criticism of music. It is because I can ask someone to hear a movement

^{2.} In fairness, Fiske and others sometimes do refer to "cognition" as interpretive or reflective in nature. As I have pointed out earlier, there is no clear statement from the theories examined in this study describing the details of 'post-cognitive' (i.e., interpretive or reflective) musical thoughts. I would prefer to refer to the above as 'post-cognitive' to distinguish it from lower-level cognitive processes (i.e., of the initial processing of stimulus data into, for instance, representations at the P, P', Pn level). All such processing, pattern formulation and reflection is probably 'cognitive,' but then we would still be left with finding a better term for 'post-cognitive.'

as beginning in a certain place, as phrased in a certain way, and so on, that the activity of giving reasons in support of such analysis makes sense. Much of music criticism consists of the deliberate construction of an intentional object from the infinitely ambiguous instructions implicit in a sequence of sounds. (Scruton, 1983: pp. 108-109)

To amplify the above point, I refer to Schenker's comment that we engage in "theorizing" or conceptualizing when we perceive. In *Free Composition*, Schenker quotes Goethe's *Theory of Colours* when he suggests that "we never benefit from merely looking at an object. Looking becomes considering, considering becomes reflecting, reflecting becomes connecting. Thus, one can say that with every intentional glance at the world we theorize" (Schenker, 1979: p. 77). However, we should be reminded of Schenker's philosophical connection with Hanslick who in turn claims (adhering to the APV) that the proper way to listen to music is to appreciate only its formal properties. On that count, Schenker says that "the uncorrupted instincts of which (the dilettante) is so proud have no value for art itself as long as they remain untrained, unrefined, and unable to move on the same level as the artistic instincts of the masters, who alone have true artistic instincts in the first place" (Schenker, 1987: i, p. xix).³

Thus, the real problem among aestheticians, critics and psychologists is in their conflicting views concerning the role of knowledge *about* musical structure, and what form a description of this knowledge would take, and whether such knowledge is ontologically strictly 'musical' (narrowly conceived). It should be noted, however, that Adorno, Dahlhaus and Schenker all agree that musical technical knowledge is a prerequisite to a full 'aesthetic' (i.e., perception-based) understanding of a composition. Cook examines this question through an exploration of the process which takes place from the initial perception of the musical (i.e., sonic) signal to the imaginative perception of it, as knowledge and rationality are brought into

^{3.} As an aside, it is interesting that Schenker seems to deem artistic proclivities as a natural characteristic exclusive to artists. In any event, it should be noted that in the above quote, Schenker was not really describing how we listen to music naturally, in terms of his often misinterpreted role of the musical equivalent of a psycholinguist (psychomusicologist?), but rather was prescribing how we *should* listen to it, in his role as a music critic. The end result is that even Schenker (an avowed formalist) must take into account the conceptualization processes that accompany all perception. Recall that CTM deems such action as 'nonmusical.'

the picture. In some way, then, the consensus is that there is an epistemological (i.e., rational, conceptual) component in the perceptual aspect of musical experience. In the next section, I explore one possible route to a clarification of the epistemological component in musical experience: that of metaphor.

10.4 Metaphor and the experience of music as form

Gestalt psychology indicates that the sensation of a tone is a psychological construct and is subject to such principles as the law of 'closure.' According to Creel, Boomsliter and Powers (1970), the experience of a single tone is not in itself an object of thought. They claim that rather

what we experience is a form which we impose. Its raw material is memory of the past portion of the stimulus and expectation of its future. The auditory input itself is, at any given instant, a single stimulus which, standing alone, has no pattern of meaning. Investigation of larger sound patterns in language and music has led to evidence that the sensation of tone itself is itself an imposed form. (Creel, Boomsliter and Powers, 1970: p. 534).

By the above statement, it would seem that the experience of musical tones is not literal, but rather imaginative, and must be imagined metaphorically in terms of something like a line, a moving shape, or a space. In other words, we impose form on what we hear, and by doing so, employ concepts which may not be described as strictly 'musical,' in the formalistic sense, but certainly metaphorical.

Scruton also contends that we explain and define series of discrete musical signals to

ourselves as metaphorical notions. He states that

it seems then that in our most basic apprehension of music there lies a complex system of metaphor, which is the true description of no material fact. And the metaphor cannot be eliminated from the description of music, because it is integral to the intentional object of musical experience. Take this metaphor away and you take away the experience of music. (Scruton, 1983: p. 106)

Cook points out that psychologists often view 'imaginative perception' as coextensive with 'perceptual construction.' However, he states that "this devalues the notion of imaginative perception, because it eliminates what Scruton himself sees as its defining properties, namely that it is voluntary and that it is amenable to rational argument" (Cook, 1990: p. 25). While it may be agreed that certain aspects of the perceptual act are involuntary, such as the way we configure the musical stimulus into groupings, I contend that rational judgements about musical structures on higher levels such as formal analysis can in fact be voluntary, incorporating such acts as so-called 'imaginative perception,' resulting in the production of metaphorical descriptions of the musical stimulus.

Dahlhaus adds to the above that the notion of 'spatiality' (or the metaphorical experience of spatiality) in the experience of music seems also to be necessarily tied to the idea of musical form. He states that

nothing would be farther from the truth than to see in the tendency to spatialization a distortion of music's nature. Insofar as music is form, it attains its real existence, paradoxically expressed, in the very moment when it is past. Still held firm in the memory, it emerges into a condition that it never entered during its immediate presence; and at a distance it constitutes itself as a surveyable plastic form. Spatialization and form, emergence and objectivity, are interdependent: one is the support or precondition of the other. (Dahlhaus, 1982: p. 12)

Thus, the very notion of form itself is not very well described in purely 'musical' terms, whatever those terms might be. Perhaps this is so because music is so utterly abstract, at least at the perceptual level, that metaphorical means are utterly necessary for descriptions and interpretations of it. The question then arises whether the link between so-called 'musical' and 'nonmusical' (i.e., metaphorical) descriptions is potentially a linguistic one. I explore that possibility in section 10.6. Meanwhile, in the next section, I shall explore the notion of the 'work-concept' and its viability for theory-making within the conceptual framework of CTM.

10.5 Musical theory and musical practice

A theory of music inevitably involves questions of history, since music often involves practices in the past. It also involves questions of value, because composers have historically done their work based on what choices they valued over others. For answers as to why they made the choices they did make inevitably points to questions of economics, social and cultural factors, and intellectual history. This in turn leads to the need for an understanding of the values and beliefs they held in respect to those factors.

The theoretical study of music can be interpreted in one way as being the study of the history and its participants. As J. Peter Burkholder states, musical theories and the analyses that arise from them

are also ultimately arguments about history, not merely perception, musical structure, or music criticism. For they assert, explicitly or implicitly, that composers in the past worked within particular constraints (of human perception, musical idiom, notions of order and structure, systems of value, and so on) and made certain choices for certain reasons. Whether these choices represent conscious intentions, unconscious inspirations, or simply the composer's assumptions and habits, they are past actions in past contexts, part of a chain of causes and effects that is the stuff of history. (Burkholder, 1993: p. 12)⁴

To this end, Burkholder investigates how composers' methods, from Corelli's time to the end of the nineteenth century, were effected by the times in which they received their training and practiced their craft. For composers of the CPP, it was essential to receive training (separately) in counterpoint and harmony. Schenker's approach to the analysis of this music works well for nineteenth-century European music because it recognizes the interplay between the harmonic and the contrapuntal, specifically because his theory aligns with the traditions in which CPP composers were trained. As Burkholder states, "Schenker's analyses show how habits of thought and procedure inculcated through practice in thoroughbass and counterpoint still determine the structure of free composition. In short, Schenker's theory works well because it is historically well founded. It is a model of how composers during a certain era thought in music, based in large part on the pedagogical approaches which taught them how to think in music" (Burkholder, 1993: p. 17).

This argument contradicts L/J's proposal that the Schenkerian model makes a good basis for theory-making which seeks to identify cognitive universals. L/J claim that the cognitive processes and structures that exist and/or are formulated in the apprehension of tonal music are achieved without the benefits and effects of specific training in harmony and counterpoint.

^{4.} I shall argue shortly that this also holds true for cognitivist theory of music.

natural. However, Burkholder maintains that even if Schenker's method works well for and understanding of tonal repertoire, its better use may be to give us "a model of how composers during a certain era thought about music, based on the methods in which they were trained, then its applicability may be quite limited historically" (Burkholder, 1993: p. 18).

In practice, Schenker's method works poorly for music composed after Brahms, because the underlying structure presupposed by Schenker does not exist in the atonal music of Schoenberg, Webern or Ives, etc. As Burkholder states, the Schenkerian method of analysis "is not a natural or intrinsic way of approaching music, any more than is any other way, and there is no reason to assume that it will work or can be adapted for other repertoires" (Burkholder, 1993: p. 20). For instance, history has taught us that the I-V-I chord progression, which serves as the paradigm harmonic structure for all CPP music, turns out to be a convention which came to be increasingly avoided by early twentieth-century composers who were looking for a way to create new masterpieces equal to the great works of the past.

Burkholder's argument calls into question the viability of any theory which supports a naturalistic approach to music. If I am reading Burkholder correctly, the thoughts of composers of each musical era are somewhat prejudiced by the conventions of their times. That being so, then it follows that listeners of each era also practice the art of listening in terms of the conventions of their respective place in history. In other words, the act of listening to music may in fact be grounded in the conventions of the listener's historical and social context. Then, following Burkholder's argument, there is reason to argue that even though there may not be a universal description of the music cognizing apparatus, it does not preclude the possibility of developing an explanation of music cognition which takes into account historical and social effects.

Lydia Goehr's investigation of the ontological question of describing the musical 'workconcept' has direct bearing on this point. As indicated throughout this study, the preeminent philosophical approach to musical ontology during the eighteenth and nineteenth centuries was through formal analysis (*à la* Hanslick, *et al*). We know that the formal analytical approach to musical ontology describes the existence of musical works in terms of universals or types. As indicated in my critical analysis of the various cognitivist models, the analytical methodology makes a good fit with internalist models because it seeks to exclude so-called 'extra-musical' considerations in its reductions. Goehr questions the analytical approach because it is so loaded with what she calls "metaphysical baggage" (Goehr, 1992: p. 19). She notes that questions such as identifying and individuating musical works, conditionals for work-existence, the identity of a musical work over time, differentiating works from one another, etc. continue to plague the analytical approach (See Goehr, 1992: p. 19). Goehr observes correctly that the limit of commitment in the reductionist approach to answering these questions is governed by its own Occamist and reductionist tendencies. The response often heard from proponents of the (formalist) analytical methodology is whether a commitment to answering such questions is even necessary. Such a commitment is indeed necessary, especially if it is to be accepted that music is first and foremost a social construction, imbued with heavy historical overtones.

Goehr's account is partly an exploration of the historical reasons for the predominance of formal analysis as a way of doing musical ontology and more importantly is an account of the necessity for viewing the notion of musical works itself in terms of history. She calls her account 'historical,' but admits that it may well have been called "genealogy, cultural metaphysics or anthropology, or historically based ontology" (Goehr, 1992: p. 7). In her 1992 book, *The Imaginary Museum of Musical Works*, Goehr makes the claim that "the work-concept began to regulate music practice at the end of the eighteenth century" (Goehr, 1992: p. 111). It is the implications of the regulation of the 'work-concept' that become the focus of this section of this study.

In moving towards a viable description of the musical work-concept, Goehr distinguishes between the choice one has of adopting either a 'pre-critical' or an 'ideological' view. In precritical terms, Goehr states that the musical work-concept involves the familiar (i.e., mainstream classical) way of describing works as "public and permanent artefacts, created by composers, and constituted by structures usually of sounds, dynamics, rhythms, and timbres, [etc.]" (Goehr, 1992: p. 111). It is important to note that this description of the musical work-concept is generally adopted by CTM. Recall that L/J draw upon this definition of the work-concept for their model of the archetypical musical 'masterpiece.'

Goehr notes that the pre-critical mode of description is at one end of a spectrum which purports to be neutral, general and devoid of content. It is the mode which best suits the APV, and by extension, the most favourable for the cognitivist model of music. The description of the musical work-concept Goehr prefers is at the other end of the spectrum, being specific, contentful and ideological. However, and most pertinent to our interests here, Goehr claims that the so-called 'pre-critical' description itself has specific and ideological overtones, having, as she states, "its roots in a peculiarly romantic conception of composition, performance, notation, and reception, a conception that was formed alongside the emergence of music as an autonomous fine art" (Goehr, 1992: p. 113). She claims that

given certain changes in the late eighteenth century, persons who thought, spoke about, or produced music were able for the first time to comprehend and treat the activity of producing music as one involving the composition and performance of works. The work-concept at this point found its regulative role. (Goehr, 1992: p. 113)

The idea of the work-concept did not remain static, but rather it came to be assumed in general parlance that composers produced works (before *and* after the late eighteenth century), even if they themselves did not conceive of their music specifically in terms of 'works,' *per se*. For instance, Bach may in fact have produced musical 'works,' but it is crucial to understand that he did not conceive of his music in terms of a regulative work-concept.

The question is, however, whether the work-concept (as a regulative concept) ever really did regulate actual practice. Goehr observes that, prior to 1800, musicians did not produce music in terms of the work-concept. She says that "if musicians used the term 'work' (or a synonym) at all, their uses did not reflect a regulative interest in the production of works...to be sure, they functioned with concepts of opera, cantata, sonata, and symphony, but that does not mean they were producing works" (Goehr, 1992: pp. 114-115). It was only into the nineteenth century that such forms as listed above began to be composed in terms of the work-concept,

when it began to take on regulative powers. That is why, Goehr claims, that we can say today (with meaning) that Bach composed works, even though he did not think of himself as doing so. We say he did produce 'works' because of the *emergence* of the regulative usage of the work-concept in the early nineteenth century, and of its eventual acceptance in general parlance as a pre-critical mode of describing music.

Goehr states that her particular critical description of the musical work-concept involves describing it "with its full aesthetic, sociological, and ontological clothing" (Goehr, 1992: p. 119), without exhibiting a need to locate a completely neutral and wide-ranging definition. Her stated task then is to describe the work-concept specifically "in terms characteristic of late eighteenth century thought" as it emerged as a regulative concept (Goehr, 1992: p. 119). It is interesting that the rise of the work-concept coincides historically with the emergence of the APV. With the emergence of the romantic notion of 'fine art' around 1800 (which is embodied in the APV), theorists were then able to substantiate the idea of a musical 'product,' serving both to motivate and provide a goal for musical theory and practice. To this end, Goehr states that "all references to occasion, activity, function, or effect were subordinated to references to the product—the musical work itself" (Goehr, 1992: p. 152). At this time, the work-concept and its subsequent restrictive subjection to formal analytical treatment became aligned.

Also at about this time, the dichotomy between so-called 'absolute' and 'programmatic' music began to find its way into compositional practice and theoretical parlance. If music was to attain (and maintain) status as one of the 'fine arts,' it became important for composers to describe their music in the terms of a formal work-concept and specifically in terms of so-called 'absolute' music. In actual practice, however, the case was not always clear. On one hand, with the ascendancy of formalistic aesthetic theory around 1800, composers were at once made free of the exigencies of worldly concerns, and also made free of the paternalistic existence that had permitted them employment. In other words, the composer lost his wealthy patronage and became a self-employed artist. Composers could now write for 'art's sake' and not in response to the demands of their employers.

With this social emancipation, however, came social responsibility, which in turn infected the distinction between so-called 'absolute' and 'programme' music, and thence the line between what was deemed 'musical' and/or 'extra-musical.' Beethoven's *Pastoral Symphony* is a case in point. The composer's textual notes at the beginning of the symphony indicate that there was a certain ambiguity whether he intended the work to refer to actual events in his life or to certain sentiments invoked by those events. Goehr indicates that composers did not actually intend that a distinction between absolute and programme music was to be made in terms of the musical/extramusical dichotomy. She states that "the concepts of absolute and programme music did not emerge so much because composers wanted to classify their work as one or the other, but more because they wanted their music to be purely musical and religiously or spiritually meaningful at the same time" (Goehr, 1992: p. 213). Thus, when submitted to the test of actual practice, composers believed themselves free to think of their music as absolute, despite the presence of a programme, and therefore, as Goehr points out, "announcing a work as programmatic did not, however, render its musical meaning impure" (Goehr, 1992: p. 213).

In relating this section of the chapter to the general aims of the whole study, it is evident that the work-concept came to be accepted as a regulative concept from the point of view of the theorist, but not necessarily from the point of view of the practicing artist: that is, the composer. I further suggest that the work-concept, specified as it was in terms of the formalism instantiated in the APV, was not necessarily a commonly adopted belief by listeners either. That is especially so, since the pre-critical notion of the work-concept was not necessarily expressed in terms of the musical/extramusical distinction, especially since the programmatic aspects of musical works were seen to add so much to the experience.

How does this point impinge upon CTM? As indicated throughout this study, CTM depends upon the musical/extramusical distinction in order to develop models which restrict the experience of music to the auditory/cognitive domain. However, as Goehr has shown, the work-concept, is ideologically and historically founded. The distinction between 'absolute' and 'programme' music, explained in this manner, reveals itself to be less viable in practice than in

theory. This then throws into question its viability in forming a conceptual framework for theorymaking in terms of music cognition, unless, of course, said framework were to be broadened to encompass the realities of musical practice.

10.6 Problems with the language/music parallel

Schenker explains the surface articulation of musical structure in terms of a specific hierarchy. This thought has led psychologists such as Lehrdahl and Jackendoff (1983) and Sloboda (1985) to draw certain parallels between theory of music and Chomsky's notion of transformational linguistics. However, I shall identify three important differences between theory of music and the notion of transformational linguistics which contribute to problems in drawing such parallels and which in turn impinge negatively upon such hypothesizing.

First, I contend that the status of Schenker's notion of 'level of background' and Chomsky's notion of 'deep structure' are simply not similar enough to warrant the drawing of a parallel between theory of music and transformational linguistics. On the linguistics side, for instance, if a sentence were not grammatically complete, a reader or listener might know something is wrong, because the meaning might not be clear. Thus, Cook says that "the deep structure of a sentence has a psychological reality for the recipient as well as for the producer of a speech act" (Cook 1990: p. 72). However, in drawing a similar parallel for music, the same psychological reality for the listener of musical structure does not persist, because, as Cook states, "people do not in general perceive musical structure as being fully co-ordinated" (Cook 1990: p. 72). Rosner and Meyer (1986) explain my objection more fully. They state that

we must point out a fundamental difference between the tree structures used in linguistics and those presented by music theorists like Lehrdahl and Jackendoff. The top node of a grammatical tree is an immediately observed datum: a sentence or an utterance. It represents some incident, occurring over time, which can be entered completely and rapidly into memory. The associated tree decomposes that uppermost node into parts at several lower levels of a strict hierarchy. The lowest nodes in music-theoretic tree structures, however, represent a datum: an actual stretch of music. Quite often, only fragments of it are held faithfully in memory. The lower nodes in the tree are not decompositions of higher ones. Instead, higher nodes are *selections* from among lower ones. We therefore cannot believe that the increasingly higher nodes, which represent ever more rarefied selections, form the core of musical perception. (Rosner and Meyer 1986: p. 37)

Second, there is a problem (in drawing parallels between music and language) concerning the relationship between the notions, 'reception' and 'production.' In terms of Chomsky's use of the term, 'competence,' meaning 'receptive capacity' and 'performance,' I interpret him to mean that people generally listen and comprehend language on comparable levels attained when speaking or writing it. Cook says that the difference in terms of music is that people can at once be skilful listeners but very poor producers, so differences in competence in an individual are much greater in the case of music than language.

Performance must be understood as more than just a mastering of a series of motor sequences. As Cook states, it involves epistemological considerations such as "knowing how to organize them into a coherent motor sequence" (Cook 1990: p. 75). I contend that on the epistemological level there is a level of competency required for performance which involves and/or requires knowledge of, on any number of levels, the structural organization of the music. Sloboda actually adds this point to his argument concerning the epistemological aspects of competence. He states that "the performance plans that most people formulate must be couched, at least in part, in abstract tonal and rhythmic form rather than in terms of specific motor sequences or even sequences of items related by relative pitch and duration" (Sloboda, 1982: p. 494). Cook reaffirms the above point that planning fingering, for example, is one of the productional strategies in which a performer uses what he describes as "productionally adequate cognitive representations of musical structure, or—to use a philosophical rather than a psychological term—it is one of the means by which they imagine the music that they play" (Cook 1990: p. 86).

Third, there is a problem in drawing a paralled relationship between (on one hand) language and thought, and (on the other) Western musical notation and music cognition. Western musical notation divides the musical flow into discrete intervallic values of pitch and rhythm. This means that to think of music in terms of Western notation amounts to taking a very specific interpretational stance, based on the assumption that the single note is the paradigmatic unit of music. On this point, Nettl savs that "the melograph, in questioning the basic assumption of the note as a unit of music, points to us something of which, because of the constraints of Western notation, we are usually not aware...It almost seems that ethnomusicologists are the victim of an analogue of the Whorfian hypothesis, according to which thought is regulated by the structure of language; musical hearing on the part of Westerners may be profoundly affected by the characteristics of Western notation" (Nettl, 1983: pp. 78-79). In response to those who would argue that people who cannot read music are not affected by the exigencies of Western notation, I would respond that the production values for Western music themselves are in an important way based on its notation. Thus, the point is not whether or not musical 'hearing' (i.e., cognition) is directly affected by notation, but rather that Western musical culture itself is based on such values as discrete pitch and rhythmic values, which, it could be argued, are in themselves manifestations of the requirements of Western notation. This might or might not be a 'chicken and egg' story, because it may be equally viable to argue that the approach Westerners often take to questions of musical structure (which tends to make a requirement for discrete pitch and time values) could itself have led to the development of Western notation as we know it. Finding causes for such thinking is not so much the issue, however, as heeding the inescapable fact that there is a strong interrelation between Western notational values and the Westerner's penchant for thinking in discrete pitch and time values.

It might be said that a language user, literate or illiterate, is affected by the structures of the language in use. So in music, it might equally be said that thoughts about music and the modes of hearing music are subject to the structural paradigms of the particular musical culture in question. These paradigms present stumbling blocks to the understanding of the music of other cultures if the structural units differ in the musical culture of an outsider. I suggest that this thought may provide the underpinnings of an argument against the proposed universality of cognitive processes in music, because, on the above account, it is always going to be very difficult to distinguish cultural from natural causes. In regards to this point, Pandora Hopkins, in an article titled "Aural thinking," (1982: pp. 143-63) reveals the results of an experiment on the influence of cultural background on musical perception. She concludes that musical perception is in fact filtered through the culture of the listener. She argues that if a listener were imbued in the cultural values of Western music, the argument for discreteness of pitch and rhythmic values as cognitively causal may not be extractable from its existence as a cultural force in Western notation.

10.7 Musical hearing: an active or passive process?

For the purposes of discussion in this section, I shall rely from time to time on Cook's distinction between what he calls 'passive' and 'active' processes in musical hearing. Cook equates passive processes with unconscious activity and denotes them as 'musical' processes, whereas active processes are equated as conscious activity and are called 'musicological' processes. Cook develops this distinction from E. H. Gombrich's (1969) theory of aesthetic perception. Gombrich contends that "all perceiving relates to expectations and therefore to comparisons" (Gombrich, 1969: p. 301). This can be achieved through various sources: first, through passive processes, which constitute the unconscious organization of the perceptual field;⁵ second, through active processes, which are based on knowledge, conventions and beliefs which emerge from a specific culture, acquired by an individual through enculturation or through specific training.

My interest concerns how active processes contribute to the indexing of a work in a given culture for a given listener who brings certain beliefs to the listening experience. For instance, in order to understand and appreciate the chance music of John Cage, it might be said that factors such as knowledge of the concepts (i.e., the cultural indexing) which gave rise to aleatoric music, and the specific means Cage employed to arrive at indeterminacy (e.g., the *I ching* as one of

^{5.} This notion is sometimes referred to in Gestalt psychology, as well as in terms of Iser's notion of 'autocorrelation.'

several means of randomization) in his compositions, would all be contributing (and potentially pivotal) factors leading to a successful understanding of his music.

Cook illuminates Iser's point (in terms of music) that a listener must bring something to a listening experience which constitutes, in my terms, a *cultural stance*. Iser states that

reading a literary work is not a passive process in which the meaning contained within the text is conveyed to its readers, but an active process in which meaning is constituted because the readers "adopt a position *in relation* to the text" (Iser, 1978: p. 169); [Cook adds] and the particular meaning that the text takes on for them will depend upon the particular expectations that each individual reader brings to his encounter with the text. (Cook, 1990: p. 143)

Meyer (1956, 1967) refers to a 'competent' listener who brings certain expectations to

the listening experience. That person is said to be acquainted with the stylistic norms of the culture and listens to music in those terms. Thus, as Meyer concludes, "music is directed, not *to* the senses, but *through* the senses and *to the mind*" (Meyer, 1967: p. 271). Note that there is a definite externalist slant to Meyer's point, implying that music is (*contra* CTM) ontologically prior to the mind's receiving of it.

Cook notes that classical Indian music is appreciated in large part by sophisticated audiences who keep the 'tala,' (a close following of the rhythmic patterns of the music) for the purposes of better appreciating the player's improvisations, which move ahead and behind the beat through the phrase structure of the raga, arriving exactly on the beat at the end. The audience, having an active and knowledgeable participation in the musical performance, experiences such music more fully as a result of their connoisseurship. Cook notes that Western classical music requires a certain connoisseurship as well. He states that

many works of the classical tradition seem to have been written for an idealized listener—a listener who is able to keep track of the formal and tonal unfolding of the music, and so appreciate, for instance, the non-structural quality of the E flat "false reprise" in the first movement of Beethoven's *String Quartet* Op. 18, No. 2, and the way in which the beginning of the real recapitulation is inadequately prepared, resulting in the explosion of dissonance that takes place a few bars later. (Cook, 1990: pp. 145-46)

However, this level of connoisseurship is not attained by most listeners, except through specialized training. Meyer (as well as Subotnik, 1981: p. 86), argues that style knowledge is

likely more generally acquired through a process of enculturation. However, contrary to the tenets of CTM, I contend that musical enculturation is achieved by more than just an accumulation of listening experiences, but rather by an accumulation of the knowledge of a culture by means of all possible sources, including listening as one of many possible avenues.

Dahlhaus (1983: pp. 13-14) makes an interesting point in terms of the so-called 'enculturation' process. He claims that knowledge is not as important for musical perception today as it was in the eighteenth century, because we tend "to hear works as individuals rather than as exemplars of a type, and this is one of the defining principles of the aesthetic attitude...whereas genres were at one time musical facts, they are now merely musicological facts, that is, facts *about* music" (In Cook, 1990: p. 147). Alan Durant argues in favour of 'point of view' listening as opposed to listening in terms of the APV. He states that "to perceive music aesthetically is precisely to perceive it as being detached from a particular social context: in other words, one dances to 'The Blue Danube' as a waltz, but listens to it as a musical composition" (In Cook, 1990: p. 147).

Cook's main thesis is that perceiving music aesthetically is not a universal trait of humans but is rather a "product of Western society since the Industrial Revolution" (Cook, 1990: p. 150). Cook quotes Kenneth Gourlay (1984: p. 32) who writes that "it is a specifically Western trait to conceive of music 'as particular configurations of sound that one either listens to or produces oneself,' and our whole approach to the music of other cultures is moulded by the ethnocentric presupposition" (Cook, 1990: p. 151). Cook is not, as I understand it, making a negative value judgement on the Western tendency toward 'aesthetic' listening and perception (narrowly conceived), but is merely stating the state of affairs as he sees it. In other words, due to the listening conventions of the culture, this is simply the way Westerners customarily approach music. His point is that 'musical' (i.e., aesthetic, formalistic) listening and 'musicolog-ical' (i.e., mediated, extra-musical, theory-formulation) listening are two different things and it is generally assumed that Westerners approach music in terms of the former.

Based on the situation outlined above, the notion of musical perception seems more complex than at first glance. I disagree with Scruton (and Cook) on one point, in terms of their contention that the contemporary Western concept of music is "characterized by no specific desire to 'find out', no special preoccupation with facts, since while these may be a necessary pre-condition for its exercise, their knowledge is no part of its aim" (Scruton 1979: p. 87, in Cook, 1990: p. 152). That may have been the custom for listeners of the music of the CPP, but that is not what the avant-garde composers of the first half of the twentieth century would have us believe. If modern Western listeners were to approach the music of Varèse, Xenakis, Stockhausen or even Cage for the purposes of simple and direct aesthetic gratification, it would more likely result in either a misunderstanding or an outright rejection of the music (which it often does).

Whatever avant-garde composers claim about wanting their works to be appreciated in an unmediated way (i.e., aesthetically, narrowly conceived), I believe audiences must employ some level of, to use Cook's term, 'musicological' listening in order to begin to come to grips with it. The fact of the matter is, at least for avant-garde music, and certainly for much non-Western music which Westerners may encounter, successful musical listening seems to require some level of so-called 'musicological' listening. Chapter 9 is devoted to proving that point.

10.8 Putting the person into music cognition theory

In his book, *lch und Du* (1923), Martin Buber makes a radical distinction between two basic attitudes of which humans are capable, which he describes as the 'I-You' and the 'I-It' relation.⁶ The 'I-You' notion designates the relation between a subject and another subject, which is described as a relation of reciprocity and mutuality. The 'I-It' notion is the relation between a subject and an object, which involves some aspect of utilization or control or activity by the subject, the object being wholly passive in the relation. In both situations, the 'I' differs in

^{6.} I have chosen (in agreement with Kaufmann) the usage 'I-You' to replace the former translation, 'I-Thou,' which Kaufmann suggests liberates the 'I-Thou' usage from implications of affectedness and theological connotations.

its perspective. In the 'I-You,' the 'I' appears only within the context of the relationship and cannot be viewed independently, whereas in the 'I-It' situation the 'I' is an observer and only partly involved. Buber states that

there is no I as such but only the I of the basic word I-You and the I of the basic word I-It. When a man says I, he means one or the other. The I he means is present when he says I. And when he says You or It, the I of one or the other basic word is also present. (Buber, 1970: p. 54)

Kaufmann states that Buber's "*lch und Du* "stands somewhere between the literary and philosophical traditions. Buber's 'It' owes much to matter and appearance, to phenomena and representation, nature and means. Buber's 'You' is the heir of the mind, reality, spirit, and will" (Buber, 1970: p. 18). I interpret Buber (in the penultimate quote) to mean that the notion, 'I' is a person, and the principal qualification for personhood is that persons resonate with their environment (which includes, among other things, other persons). A person's environment, being made up of objects and other persons, is always in an existential relation to them. That is how I understand Buber's statement to mean that for every 'You' or 'It,' there is an 'I' present.

Buber contends that the 'I-You' situation cannot be sustained indefinitely, and every 'You' will from time to time become an 'It.' Buber believes that it is normal and healthy to have this dialectical situation and it is through this dynamic that objective knowledge is acquired and finds expression. According to Buber, every 'I-It' relation has the potential of becoming an 'I-You,' a situation which permits a person's true personality to emerge within the context of the world.

In terms of the APV, persons and music are presumed to be in an 'I-It' situation in which music is treated as a passive aesthetic object (i.e., a musical work) which is actively apprehended by a subject, the listener. The listener, according to the APV, ultimately controls the acts of apprehension, appreciation through a process of the aesthetic judgment of the formally unified and regionally intense aspects of the aesthetic object. In undertaking the task of aesthetic judgment in an APV situation, the 'I' is decidedly deemed not to be engaging in a participatory role with the musical aesthetic object. Thus, when it is said that one *participates* in a musical act in terms of the APV, there is no implication of a subject interacting with an aesthetic object in any similar sense that exists in an 'I-You' situation. In a standard APV setting, the 'It' (the aesthetic object) is passive, the 'I' is active.

The question arises as to how the 'I-It' (subject-aesthetic object) situation applies to CTM. I think there is a relation, but I wish to demonstrate that that relation excludes the notion of an 'I.' My contention is that CTM presumes an 'It-It' situation between the listener and the aesthetic object. The notion of 'I' does not enter into the equation because the processes of music cognition are deemed to occur between a hypothesized music cognizing mental apparatus (conceived as an 'It') and the aesthetic object (conceived as another 'It'). In all the theories examined in this study, it is only at the reflective level (post-music cognition) that the person is even implied to be entering the picture. Nevertheless, music cognition is presumed to have already occurred by this time, so the action of music is presumed to be performed by an 'It,' the cognitively inaccessible cognizing apparatus. Also, the notion of an objectified music cognizing mental apparatus, operating in terms of formal processes on auditory stimulus data, is segregated from its contextual or environmental situation. According to the standard orthodoxy of CTM, the listener's music cognizing apparatus is predisposed to act in this manner by virtue of innate mechanisms which in this case, to use Fiske's terminology, by virtue of naturally instantiated 'aesthetic attitudes.'

In terms of relating a listener to a performer and/or a composer, the APV (manifestly espoused and/or scientifically naturalized) stipulates that any such relations are to be understood, by definition, as 'nonmusical.' Therefore, aesthetic judgments must only, by definition, relate the aesthetic object to the recipient cognizing mechanism. This in effect, precludes the existence of any and all intersubjective situations among performers, listeners and composers to be construed as party to the music cognition act. In short, the hypothesized natural instantiation of the APV does not permit, by definition, the existence of a specifically 'musical' 'I-You' situation. The relations between and/or among performers, listeners and

composers may indeed be taken to be intersubjective, but on this account, never 'musical,' and therefore not to be considered a matter for music cognition.

I contend that to reduce the notion of music cognition to the extent that it results in the exclusion of persons defeats the purpose of the effort. It seems to be a fruitless and pointless task to endeavour to discover how and why persons participate in music and then to exclude them from the explanation. This is precisely what the CTM effort has achieved. The question then arises how to get persons back into the picture of music cognition. I have a few suggestions.

The first step in bringing persons back into the conceptual framework of music cognition (and theory about it) is to reinstate the APV as a *theoretical* stance from which to examine music cognition and in doing so, remove the APV from the *ontological* status granted it by CTM. With this move in place, certain situations can be permitted to be considered when formulating an alternative concept of music cognition which incorporates the notion of 'person.' First, the 'I-It' relation between musical works and the person can be expanded so that the 'It' includes the environment or context in which the music is heard (i.e., the manifest image of music). In such a situation, the relation between the aesthetic object and the person is mediated by other objects (and activities) which affect the listening context. In doing so, we cease to consider music cognition in terms of a direct, unmediated relation between the listener and the musical object. In this way, the formulation of a new concept of music cognition emerges, taking into account Garfield's notion of mental processes supervening on a large and irregular environment.

This brings me to the next important step, that is, to the de-reification of composers and their consequent reinstatement as persons. It is an obvious point to say that Mozart and Cage were once persons (and to some extent, still are persons, through their works). However, it is an unfortunate point that on most accounts, Mozart and Cage have been reduced to objects, on a par with their works. That is, it is insidiously objectifying (reifying?) to say "I heard Mozart at the mall or Cage at the university campus concert hall" because the concepts embedded in Mozart and Cage as persons become folded into the notion of them as objects.⁷

The project of the de-reification of composers effects a re-contextualization of them as persons who create(d) musical works and live(d) musical lives. With this situation in place, a listener's hearing or a performer's playing or singing of a work of Mozart, for example, sets up a triadic dynamic relation which involves the participant, the composer and the music. This relation may even extend to encompass the historical and cultural context in which the composer lived. Of course, in terms of playing historical music (i.e., music of dead composers) there is an added dynamic which persists between the historical and cultural contexts of the participant and the composer. Interestingly, if the composer were still alive, the interpersonal dynamic between performers and composer might result in being greatly intensified. Ultimately, the end result of the de-reification of the composer is that their works become personalised, and something of the composer's personal being is infused in the interpretation and apprehension of their works.

In Buber's terms, the relation between the musical work and the participant (performer or listener) then becomes something like an 'I-You' relation, because the musical work then becomes an extension of the person (and the life and times) who created it. In a certain sense, it is the re-contextualization of composers as people (who live or lived in a certain time and place) and the personalized connection they have with their musical works that unifies the concept, 'musical work.' The act of de-contextualizing the work (in terms of the APV) then becomes purposeful and useful if the sole intention is to examine its formally unifying features or the intensities of its regional qualities. The point is that inasmuch as such a move may be beneficial for a utilitarian purpose, such as formal analysis, it should never be meant as a *de facto* replacement for total musical experience. Such a move should merely be taken as a means to the investigation of a particular aspect of musical experience.

^{7.} Adorno has much to say about this issue, as well as in terms of the isolation of the artist from contemporary society and the commodification of art.

In Buber's terms, one can temporarily adopt an 'I-It' relation with a musical work for the purposes of study, but the relationship eventually swings back to an 'I-You' situation when the work is re-contextualized. As indicated earlier, Buber believes that it is normal and healthy to have this dialectical situation and it is through this dynamic that objective knowledge is acquired and finds expression. Thus, every 'I-It' relation has the potential of becoming an 'I-You,' a situation which, in terms of music, permits a person's true personality to merge with the context of the world of music.

There is another dynamic relation that persists in music that is excluded in terms of the APV and CTM: that is, the relation between listeners and performers. This can be understood as a dialectical (or dynamic) relation which swings back and forth between the 'I-You' and the 'I-It' situations. The performer's job is to interpret musical works. Ostensibly, the performer attempts to re-create what the composer intended in the work. We have already seen how that dynamic evolves. In Chapter 9, I discussed the performer's role in aleatory, which is elevated to composer status. That is, the decisions made by a performer in an aleatoric performance greatly resemble those made by the composer. In terms of a traditional (i.e., CPP) setting, the performer has less to do in terms of decision-making. Nevertheless, it is a common enough occurrence that listeners tend to prefer one performance (or one recording) over another to resist our ignoring of the role a performer plays in a listener's cognition of a work.⁸

The performer has a world view, and lives in a time and place. In other words, the performer's personal and historical and cultural contexts provide filters through which music

^{8.} As Goodman (1968) states, musical works are allographic, involving the added elements of performers in performance. Following an APV (work-concept) conceptual framework, Goodman's intention, in defining a musical work, is to remove the level of indeterminacy that exists in musical performance. Goodman's solution is to take the performer out of the ontological picture by claiming that the true status of a work is in the score, since that is the only version that is note-perfect and unchanging. Although the purpose of this study is not to discuss the merits (or demerits) of Goodman's thesis, it nevertheless points to the problems involved in adopting the APV, which restricts the status of art to the aesthetic object. For music then, on this view, the score becomes the only object worth talking about, and that, in my view, is emblematic of problems concerning the APV: that is, it precludes the integral role performance plays in the apprehension of music.

must travel before reaching a recipient. In this way, the recipient engages with the performer as well as the music. There is a dialectical situation which swings back and forth between an 'I-It' relation (with the music) and an 'I-You' relation with the performer. It is through this dialogue that the recipient's (i.e., the listener's) knowledge of the work evolves. In terms of music cognition, the recipient takes in the particular sounds made by a particular performer, in the particular setting of the particular performance. The recipient gains knowledge of the work itself, but also of the performer and the performing context. That is, the recipient receives the music through a personal, cultural, and historically contextualized filter.

To summarize, the complex relation between musical works, performers, composers and recipients, with all the personal, cultural, and historical contexts in place, is the situation upon which the activity of music cognition must supervene. Each cognition of a musical event involves a complex relation between and among all the aforementioned factors. The T' in the relation is ever present, in a dynamic setting which takes into account the sometimes 'It-ness' and the sometimes 'You-ness' of music and all it entails. However, the central point is that the music cognizer is never an 'It,' that is, an object, a music cognizing apparatus.

In the next section, I shall examine how the hypothesized object status of the music cognizer in CTM makes a good fit with the thesis, 'music education as aesthetic education.' I shall then offer an alternative view which brings the notion of "person" back into the conceptual framework of music education.

10.9 Technology, music education, and aesthetic education

There is a situation described in the previous section which forms the essential underpinning for the hypothesis, 'musical education equals aesthetic education' (hereafter MEAE). The first assumption of MEAE is that the subject (i.e., the student) is presumed first and foremost to be a listener, even when involved in performative or compositional activity.⁹ In

^{9.} I have indicated throughout this study that the identical situation persists for CTM.

this section, I intend to indicate how well the conceptual framework for CTM fits with the notion of MEAE. I shall begin by fleshing out MEAE as a concept.

First on the order table is that, according to the MEAE model, music is presumed to be an aesthetic object, that is, to be apprehended in the narrow view prescribed by the APV. That is, the listener is presumed to be in a cognitive relation with a musical (aesthetic) object. The sole factor of consideration in terms of the epistemological base of the listener is the listener's accumulated listening experience in a given musical idiom. In Buber's terms, the MEAE hypothesis presumes the listener (i.e., the learner) to be in an 'I-It' relation with the musical object. In terms of MEAE, the occurrence of intersubjective relations between learners (as performers, listeners and/or composers) is deemed 'nonmusical,' and is therefore a non-issue. In other words, the MEAE model disavows any construal of an 'I-You' situation as a viable component for learning music, on the grounds that such situations are ontologically 'nonmusical.'

The question arises how this view impinges on such matters as music curriculum in schools. In fact, the MEAE hypothesis makes the formulation of curriculum a relatively simple matter: that is, music education becomes effectively the study of musical aesthetic objects. This permits certain situations to unfold. First, it becomes possible to isolate the subject (i.e., the student) for the purposes of creating what Buber might call an 'It-It' situation. That is, the educational goal for MEAE (with CTM and its concomitant research project as its principal weapons) is to set up a situation between a cognizer and an aesthetic object which is unmediated by any so-called 'nonmusical' factors. Within the stipulations of the MEAE model, the act of listening (and perhaps subsequent formal analysis) is deemed to be paramount. Although performance is not excluded from the model, it is included only with a view to providing some means of promoting aesthetic education. The physical and social aspects of performance are deemed by MEAE to be secondary to the central goals of the model.

The question arises how the MEAE is best put into practice in a contemporary educational setting in which perhaps budgetary restraints do not permit a fully developed perform-
ance program. This is where technology comes into the picture. There is a proliferation of software programs on the market which focus on particular works, such as Beethoven's *Symphony No. 9* or Berlioz's *Symphonie Fantastique*. The student works through such programs on an interactive basis, exploring the work in a 'music appreciation' mode of learning.¹⁰ The job of the classroom teacher (who, in effect, has taken on the role of software consultant) is only to facilitate the operation of the software program. With the machine (and its software) providing all the answers for the study of the musical aesthetic object, the traditional concept of teaching, as an intersubjective activity, is made obsolete and redundant.

However, with such technological advances, there is something else that is also eliminated: that is, the need for the social situation that is provided for in a person oriented educational setting. The interesting point is that I raise the idea of the 'need' for a social situation in terms of a learning situation which effectively eliminates it. In an important sense, however, the socio/educational setting may be eliminated for certain reasons, such as budgetary restraints, but the human need for a social setting may not ever disappear. As a result, the human interaction that is so necessary for the acculturation and socialization of the individual is jeopardized by the unhampered advancement of technology. That is not to say that technology does not have a place in the classroom, as one tool for education, but the danger is immanent that, with the fascination bordering on religious devotion to technology, that the purely technological musical 'classroom' will be with us in short order.

^{10.} I have used the term, 'interactive' in the manner advertised by computer companies, which implies that a person actually interacts with a computer in the manner of an 'I-You' situation. In my view, the use of the term 'interactive' (and the concept it represents) grants it much more currency than it properly deserves: that is, so-called 'interactivity' between a computer and a human is really just an 'I-It' situation. The only real interaction that takes place is on the part of the human who operates the machinery. The machine, of course, programmed to respond in terms of its software, does not interact in any way with the human pushing its buttons. It is up to the human operator to adapt to the requirements of the machine.

What will be the long term result of such a situation?¹¹ In my view, it opens the door for a kind of pervasive individualism that endangers the very fabric of society. For the individual, life becomes a series of 'I-It' situations. The process of the objectification of people in effect reaches its final conclusion with the elimination of 'I-You' situations. In a typical, or rather, traditional music learning situation in most cultures, there is a teacher and one or more students. The teacher is a mentor as well as a dispenser of knowledge. The teacher is a person who has received (as a student), and is in the business of transmitting to the next generation, the traditions and practices of the musical culture to which students and teacher belong. There is, for instance, in Western music, a lineage of learning that stretches back to the great masters of eighteenth-century Europe. Comparative situations of musical heritage exist in every society in the world. In turn, some of the individuals of each generation of students in turn become teachers, passing on the traditions of the generation before, through the filter of their own time. In that way, the traditions of a (musical) culture evolve.

Another crucial dimension in a truly interactive (i.e., intersubjective) learning situation in music has to do with the interaction of students among other students. When students participate in musical ensembles, important social skills, such as co-operation, patience, empathy, humility, responsibility, etc., can be permitted to develop. A person's individualism develops in resonance to those around her. Thus, the kind of education which one receives in a musical ensemble is manifold. First, a person finds herself in close contact with other persons who are in the pursuit of similar musical goals. Those goals are set and achieved in terms of the success of everyone in the group.

For instance, a group of young instrumentalists may be formed into a string quartet or a brass quintet at a music camp. Let us say that the group (who are hitherto strangers) is asked to prepare, with the assistance of a coach, a work by Beethoven for a camp student concert. During this time of intense preparation, the students become acquainted with each other and

^{11.} Keeping in mind that this section concerns the effects of aesthetic education on music education, the points I raise here can be applied in terms of the implications that a technological classroom may have for education in general.

the music they prepare. They learn the responsibilities of individual preparation between rehearsals and the co-operative values of successful group practice. They also learn to rely and trust themselves as individuals and each other in the actual performance. They also learn to rely upon and respect the experience, knowledge and guidance of their mentor, the music coach. They may also develop friendships which extend far beyond the music camp. Through all of this, the participants do not simply come into contact with their musical culture: they become an integral part of the culture itself.

Second, there is a complex set of relations that evolves between the music itself and the individual students. Through the study and performance of a particular musical work by Beethoven, for instance, the participants gain a level of intimacy with the music and the composer that simply cannot be achieved in a passive listening situation. In the act of *doing* music, persons interact in a complex way with the composer and the music. If the level of activity is intense, it is possible that participants can transform the '1-It' situation between the work and the participant into a kind of '1-You' situation that brings the work and composer as a person into a type of personalized relationship. Just as an actor in *Hamlet* cannot help but feel a closer contact with Shakespeare than the theatre goer, a person involved in active participation with the music of Beethoven cannot help but find a relational level that becomes intensified and potentially dialogical with the composer and his time.

The life skills I have touched upon in the above paragraphs are only a brief summary of what I believe can be achieved under the broad label, 'music education.' The purpose of my comments is not to provide a comprehensive elucidation of the goals and benefits of a personoriented model of music education, but rather to point to the shortcomings and potential hazards of a CTM-inspired MEAE model. The connection I have made earlier between the MEAE model and the individualistic conceptual framework of CTM cannot be underemphasized. Finally, to re-emphasize my earlier point, an individualistic model of music cognition fails to give proper consideration to the intensely socialised ontology of music, as a human practice and as a social construction.

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Twentieth-century musical works

Ashley, Robert. Quartet (mid-1960's). in memoriam...Estaban Gomez. Symphony (mid-1960's) in memoriam...Crazy Horse. Examples of process music.

Boulez, Pierre (1952). Structures. Early example of process music.

Cogan, Robert (1978). utterances... Example of psychoacoustic music.

Debussy, Claude (1912). Jeux. The first example of moment form.

Feldman, Morton (1959). Last Pieces. Early example of process music.

Glass, Philip. Strung Out. (1967). Early example of process music.

Lucier, Alvin (1968). I Am sitting in a Room. Example of psychoacoustic music.

Messiaen, Olivier (1960). Chronocomie. Example of moment form.

Reich, Steve (mid-1960's). It's Gonna Rain and Come Out. Early examples of process pieces. Slow Motion Sound (1967). Process piece using tempo transformation with pitch and timbre retention. Drumming (1971). Process piece using phase shifting.

Schoenberg, Arnold.

Works relying on extramusical forms: Erwartung (1910) Die glückliche Hand (1910) Pierrot Lunaire (1912)

Stockhausen, Karlheinz.

 Gruppen (1955/57). Spatial deployment of sonic forms.
 Klavierstücke I - X (1954-61). The relationship between determinacy and indeterminacy. Serialization of the criteria of sound production in performance.
 Kontra-Punkte (1952-1953). Example of nonmoment permutational form.
 Kontakte (1959-60). Example of moment form.
 Mixtur (1964). Example of moment form.

Stravinsky, Igor.

Symphonies. Example of moment form within traditional kinetic forms. Sonata for Two Pianos (1943-44). Example of moment form within traditional kinetic forms.

Varèse, Edgard. Octandre (1924). Density 21.5 (1936). Ionisation (1930-31). Examples of sculptural spaciality, variegated perspective, juxtapositional, static time.

Young, Lamonte. Composition 1960, no. 7. Example of static form.

Xenakis, I. Bohor I (1963). Example of static form.







TEST TARGET (QA-3)









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