

MUSIC AND KNOWLEDGE

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There are, needless to say, multiple ways in which music *might* be related to knowledge; and no doubt, too, the actual ways are but a very small subset of the still probably finite number of imaginable ways. In the last few decades, cognitive science has often been invoked in discussion of putative musical knowledge—for example, by the philosopher Diana Raffman in her *Language, Music, and Mind* and, probably most notably, by the composer Fred Lerdahl and the linguist Ray Jackendoff in their *A Generative Theory of Tonal Music*. One cannot doubt, even at this comparatively early date, the contribution that scientific psychology, done from a broadly “cognitivist” frame of reference, can make and has made to the understanding of the human mind in relation to music. If empirical science cannot tell us, as it surely cannot, what music is *worth* listening to, there remains the strong possibility that music psychology, including neurology and evolutionary biology, can tell us ever more why humans are so drawn to music and what they perceive *in* it and *from* it, and thus *why*, at least in some measure, they do evaluate music in the ways they do.

With respect to knowledge, cognitive science has had a special, though not exclusive, concern with sorts of knowledge that are called innate or tacit or unconscious as contrasted with those that are learned or introspectible or conscious. In that spirit, I propose in this paper to raise and give tentative answers to two questions in which knowledge that is innate or unconscious and having to do with music would seem to be at least strong possibilities. The first concerns knowledge that we *bring to* music, the other knowledge

that we *get from* music—what I shall call, briefly, knowledge-for and knowledge-from listening to music. And it is well to keep in mind that, in another dimension of analysis, both knowledge-for and knowledge-from admit of a three-way distinction of knowledge-that, knowledge-how, and knowledge-of, as we shall see shortly.

It is well to begin these investigations with some reflections on the power and importance of music in human affairs. We have good reason to believe, on the "historical" side, that music may even have antedated that burst of human creativity—as evidenced for us mainly in tools and cave paintings—that occurred in our ancestors of about 40,000 years ago. Some even believe that our Neanderthal cousins had music in some form, perhaps learned from our own ancestors but perhaps—in an importantly different sense of 'from'—from innate impulses common to our genus even as far back as the half million years or so of the last common ancestor of them and us. It must be admitted, however, that what we know about the evolution of our species has so far not had much to tell us, in specifics, how there came to be organisms—ourselves—for whom music has the impressive value and power that it does have.

There is no reason, everything considered, to doubt that there does exist among the full facts of the matter some interesting ones about how the "music gene" came to be a favorable adaptation in *homo sapiens* or one of its ancestor species, although it must also be admitted that, *prima facia*, it would seem that the sorts of behaviors that constitute the practice of music would, if anything, be detrimental to purpose of favorable differential reproduction. But we shall see, although I shall not mention it again explicitly, that, looked at in a certain way and in the light of certain theories, the facts about the importance of music might be seen to fit more comfortably with the demands of evolutionary theory. Nor, by the way, do I mean to be begging any questions by speaking of a "music gene"; it is only a convenient way of referring to what it is in our biological nature, whatever it is, that—on a weak view—makes it *possible* for us to engage in musical behavior or—on a stronger view—almost *compels* that kind of behavior. But, as an initial point in favor of the stronger thesis: if a behavior can be said, usefully, to be *natural* to a species when, in one sense, it is highly likely to occur; or when, in another sense, its denial or inhibition correlates with increased mental anxiety and disorder, then we may say that music is surely natural to human beings in both senses.

But just what are some of the facts about the power of music for human beings? First of all, there are the anthropological facts including, above all, that music exists in every human culture known to historiography and social science. To be sure, some cultures, usually for religious reasons, greatly restrict music making—partly just because of its power—to narrowly

circumscribed occasions, but no culture altogether lacks times and places for making music. This fact connects with a second fact of a sort we may also call anthropological having to do with the amounts of human and other resources that are devoted to the study, performance, appreciation, advocacy, composition, and teaching of music. The figures are not easy to come by, but we may reasonably believe that music consumes more time, effort, and money than all of the other arts—even very broadly construed—put together, and probably more than athletics, even in our sports-obsessed societies. Be that as it may, there is no doubt about the pervasive appearance and immense power of music in the lives of all peoples of all societies.

Yet a third anthropological fact concerns the wide variety of occasions on which music is used—presumably to enhance some feature of the occasion that is taken to be essential to it: the solemnity of a funeral, the merriment of a wedding feast, the excitement of a soccer match, the importance of a state ceremony, and so on and on. In fact, we humans use music in so many of our ceremonial and ritual occasions that in some societies the use of music virtually defines them as being just those sorts of occasions.

But, of course, underlying all of these anthropological facts—facts about the publicly observable role of music in mostly collective circumstances—are the *psychological* facts; that is, the connection of music with the individual human being. All such facts, whatever they are, presuppose that the subject is a conscious being, but one must not presuppose that all or even most of the important facts, or indeed any of the most important facts, have very much to do with what a person can or would report about his or her experience of music, that is, what goes on in the conscious, introspectible mind. This, however, is already somewhat to anticipate conclusions yet to be argued for. Yet this presupposition is attested to, if not always knowingly by their authors, by the now hundreds of studies that have been undertaken in the last century and a half under the general heading of *music psychology*. For music psychology, both experimental and theoretical, is the attempt to understand the nature of the human mind with respect to music—how we hear it, how we learn it, how we respond to it, and so on. And while it has not, at least explicitly and for the most part, seen its goal also to explain the overarching anthropological facts of the sort I just cited, it is obvious, insofar as we are “individualist” with respect to the nature and explanation of social phenomena, that it is in the science of music psychology, backed by neurology and evolutionary biology, that we shall locate ultimately most of the *empirical* facts that are relevant to explaining the power and importance of music for human beings.

But, as I hope to demonstrate in practice in the remarks that follow, these empirical facts, whatever they turn out to be, can be understood and assigned their comparative importance only in light of certain philosophical theories

about the nature of, most importantly, consciousness, unconscious awareness, and knowledge—notions that practicing scientists as well as musicians tend to look on with some mixture of anxiety and skepticism. The first part of my claim is perhaps neither surprising nor controversial among philosophers who are interested in the idea, presuppositions, and claims of this or that aspect of cognitive science, but my experience, as a philosopher who has attended several conferences on music psychology, tends to confirm, alas, also the second part of my claim, which is itself a constituent of the larger, and often justified, skepticism about philosophy among practicing empirical scientists.

The other side of this complicated coin is the fact that many philosophers are suspicious of the idea of cognitive science in general or of the specific claims of this or that piece of cognitive science in particular. Some of this skepticism derives, no doubt, from political motives—and this despite Noam Chomsky's left-wing innatism—to the effect that the dignity and equality of human beings is somehow threatened by attempts to show that significant human behaviors are strongly grounded in innate mental structures or dispositions. For this is taken to suggest either that these behaviors are not, to the desired degree, under our control, or that the differences in the skill or frequency or intensity or some other dimension with which the behaviors are exercised rest on innate (genetic) differences among us either as individuals or as members of some subset of humans. These kinds of considerations we may dismiss immediately, at least as to what the facts of the matter are, for those facts do not depend to the slightest degree on what anyone *wishes* humans were like.

But on the factual side, as contrasted with the non-relevant normative side, many philosophers have anyway tended to be attracted to accounts of complicated human skills in terms of *learning* as contrasted with, if I may so put it, *genes*. Just why this is, or has been, the case is a result of very complicated social and intellectual factors. But an important part of the story has to do with the tradition of *empiricism* among analytic and scientifically-minded philosophers, going back to Hume and even earlier, a tradition that is suspicious of anything that seems to be of a sort to be called *innate* knowledge. All knowledge, we are told, comes from sense experience and, possibly, introspection and other awareness of our own mental and bodily states; none is already stamped on us at birth or comes only through normal physiological development. For these philosophers, defenders of any kind of innate knowledge are looked on as confused about the requirements of knowledge or else unwilling to find out just how much can be explained by learning.

Until recently, too, the discipline of music psychology largely reflected this frame of reference with its initial suspicion of any kind of innatist

theories. The beginnings of music psychology as an empirical enterprise are to be found near the beginnings of experimental psychology itself, that is, in the mid-nineteenth century in the laboratories of such figures as Carl Stumpf and Hermann Helmholtz, but the person widely known as "the father of music psychology," Carl Seashore (who, as it happens, made his career at my own institution of the University of Iowa), comes on the scene only toward the end of the second decade of the twentieth century. Seashore himself, from whatever specific cultural and intellectual factors but consistent with the emerging school of behaviorism in psychology—understood here as insisting on the predominantly *learned* component in explaining human behavior—was strongly anti-innatist with respect to understanding musical behavior; and his views were to form the atmosphere that prevailed in music psychology—largely then an American discipline, at least as an experimental enterprise—for the next half century.

What happened toward the end of that period was, in a word, *Chomsky*, and, in a few more words, the beginning of cognitive science. By now there are many workers in the field of music psychology who are investigating music from the evolutionary, genetic, and neurological perspectives and in ways that almost necessarily raise questions about the possibility of innate factors that underlie our hearing, understanding, and appreciation of music. Still the most important of these studies, I submit, is Lehrdahl's and Jackendoff's book which dates from 1987. And I propose, for the next several pages, to use this important study as a basis for raising the question of what I called knowledge-for music, that is, knowledge, if there is any, that must already be in place in order to explain the human response to music.

In their Preface, Lehrdahl and Jackendoff note that among the first to suggest that the "insights" of Chomsky's transformational-generative linguistics might profitably be applied, in the search for a presumably universal "musical grammar," to the domain of music was the distinguished American composer and conductor, Leonard Bernstein, in lectures he gave at Harvard University in 1973 and published in 1976. In fact, it was these lectures that gave rise to seminars and study groups in the Boston area of which their book was one eventual result.

Like Chomsky with respect to language, Lehrdahl and Jackendoff seek a "competence theory" with respect to music. A competence theory would be one that has as its goal "a formal description of the musical intuitions of a listener who is experienced in a musical idiom." Such musical intuitions are further characterized as "the largely unconscious knowledge that the listener brings to his hearing—a knowledge that enables him to organize and make coherent the surface patterns of pitch, attack, duration, intensity, timbre, and so forth." (p. 3) Furthermore, we are to understand that much of this unconscious knowledge—not all—is universal in the species, and as such

may plausibly be regarded as *innate*—innateness being usually the best explanation of universality. Lehrdahl and Jackendoff make clear that they are not dealing with "affect," that is, with the emotional side of music, as I shall do in the latter part of this paper, but only with the *structure* that the listener hears in, or attributes to, the music.

Before we turn to some specifics of the theory, we should note that Lehrdahl's and Jackendoff's general conclusions are, indeed, that the understanding of music is "a domain of human cognitive capacity," and that "Much of the complexity of musical intuition is not learned, but is given by the inherent organization of the mind, itself determined by the human genetic inheritance." (p. 281) Thus we are to understand that we human beings, from whatever evolutionary pressures and adaptations, are genetically structured in ways that predispose or constrain or even necessitate us to hear music in certain ways and not in any of the other, numerous or even infinite, merely possible ways. And it is, so we may reasonably assume, in the attribution of structure that lies the difference between the human response to music and the responses of members of other species, many of whom obviously are affected by sounds of the sort we humans call music.

Like Chomsky in his transformational-generative grammar, Lehrdahl and Jackendoff propose to state the heart of their theory as consisting of certain "non-introspective" *rules*, where a rule expresses "a generalization about the organization that the listener attributes to the music he hears." (p. xii) These rules, on the theory, are of three sorts: first, the *well-formedness rules*, "which specify the possible structural descriptions;" second, the *preference rules*, "which designate out of the possible structural descriptions those that correspond to experienced listeners' hearings of any particular piece;" (p. 9) and third, the *transformation rules*, which "apply certain distortions to the otherwise strictly hierarchical structures provided by the well-formedness rules." (p. 11) The transformation rules on their theory, and unlike the linguistic theories that inspire it, play a very minor role, and so we shall dismiss the possible suspicion that, as characterized, such "rules" are there merely to accommodate those cases that don't fit the theory as defined by the well-formedness and preference rules.

Each kind of rule, in turn, applies to four different aspects of structure; namely, in their terminology, (1) grouping structure, (2) metrical structure, (3) time-span reduction, and (4) prolongational reduction. We need not bother with the precise definitions of these notions to proceed. Here is an example of a well-formedness rule about grouping, their first one:

Any contiguous sequence of pitch-events, drum beats, or the like can constitute a group, and only contiguous sequences can constitute a group. (p. 37)

If this sounds more like a *definition* of 'group' than a rule about how we hear music (although it does, importantly, say that anything we hear as a unit of music requires contiguity), consider the rather more specific well-formedness grouping rule that:

If a group G1 contains part of a group G2, it must contain all of G2. (p. 38)

This rule tells us, in effect, that there are no overlapping groups—as defined, I would say. Now here are some examples of preference rules (I've picked some of the simpler ones so we can grasp them more easily, although some of the more complex ones have, as one would expect, more content of substance to them). The first, a grouping preference rule, is:

Prefer grouping analyses that most closely approach the ideal subdivision of groups into two parts of equal length. (p. 49)

The second, a metrical preference rule and one that is specifically cited as universal by Lehrdahl and Jackendoff, is:

Prefer a metrical structure in which beats of level *Li* that are stressed are strong beats of *Li*. (p. 79)

These few examples, even when combined with what I have already said about their work, give very little idea of the depth and richness of Lehrdahl's and Jackendoff's theory and its elaboration in their book. But it is enough, I believe, for me to proceed to consider the issues of musical knowledge in the sense of knowledge-for music, knowledge that we have, if any, that we bring to the ways in which we hear music.

We may begin by observing, in presumed agreement with Lehrdahl and Jackendoff, that the experiences and reports of the listener, considered individually and from the point of view of the listener, are of almost no value in assessing their theories of innateness and universality. For just as in the case of language, the individual practitioner would rarely be in a position—and certainly not by virtue simply of knowing a language—to know how the structure of his or her language compares with the range of all abstractly possible structures nor, even more to the point, that the structure of one's own language is, within the probably infinite domain of possible structures, very similar to the structure of all other human natural languages. Similarly, in the case of music, the listener—engaging in whatever reflection and introspection of one's own musical experience as one may—will never

discover how the structures that one hears in, or attributes to, the music compare to all possible structures nor, again, how similar the structures one does hear in the music are to the structures most or all other humans do or would hear in the music. No, these matters are not ones to be settled by the report of any individual listener, for they are not matters about the individual listener in the relevant sense—as we have just seen. And I will say also, without further ado but without yet answering the question of whether or not it is *knowledge* that we are dealing with, that we, in fact, do now have more than adequate empirical evidence reasonably to conclude that there are in us innate and therefore universal structures of a specificity that strongly constrain how we hear music.

But are these structures pieces of knowledge, as Lehrdahl and Jackendoff maintain as, for example, in my earlier quote from them? Perhaps more important than arriving at a simple yes or no answer to this question is showing in what ways these innate structures do or may and in what ways do not or may not resemble what philosophers conceive knowledge as being. No doubt some exercises of this sort have already been undertaken with respect to analogous claims about knowledge—including those of Chomsky himself—with respect to language. But it will be useful, I judge, to proceed with the case of music—as may not have been done before.

In the spirit of Gilbert Ryle's most famous chapter of his *The Concept of Mind*, we may begin with the distinction between knowing-how and knowing-that. Although, as critics have shown, the distinction is not really as precise as it initially appears, we may agree with Ryle's main point in making the distinction; namely, that knowledge-how does *not* presuppose knowledge-that. Knowing how to swim is not the application of theory to practice, even if, in some cases, some knowledge of truths—that is, knowledge-that—may be useful. And I think it is clear that if we agree with Lehrdahl and Jackendoff, as I am prepared to do, that the sort of competences they are talking about can usefully be characterized as the unconscious application of certain rules to the music one hears, then the sort of knowledge that is involved is *at least*—but not necessarily only—a kind of knowledge-how. For being able to apply a rule—and especially a rule of whose content one is not consciously aware and cannot become consciously aware of in oneself—is just to have a certain *capacity* or *ability* or *power*. It is universal among the innumerable capacities that we humans have not just in its subject matter but also in what we might call its *prescriptive* nature—that we *must* hear music in certain ways if we hear it at all. But being constrained or even necessitated to do something presupposes being able to do it, and capacities are just what we are talking about.

But is that all there is to it? That is, granted that the existence of these innate mental structures that apply to the listening of music amounts at the

least to possessing certain capacities—a knowing-how to do something—does it amount to that also at the most? In the case of language, Chomsky has long insisted that his findings have constituted a refutation of empiricism and support for rationalism—the doctrine of innate ideas of the early modern philosophers. That, as members of a certain species, we are born with certain capacities of behavior or capacities to acquire capacities never has been, or should have been, in the least degree questionable, for the very notion that an organism (or anything, for that matter) is of a certain natural *kind* clearly implies just that kind of fact for the members of each species. No, those who, in the cases of both language and music, speak of unconscious knowledge and the like mean to say that such knowledge consists, at least in part, of knowledge-*that*, innate structures whose perspicuous representation in language is in the form of *propositions*, that is, entities with *truthvalues* and that can be *believed*. Lehrdahl's and Jackendoff's rules take the form sometimes of categorical and conditional imperatives (in the purely grammatical sense) and also sometimes of categorical and conditional indicatives (which larger distinction, however, does not map directly on to the wellformedness/preference distinction). But whichever form it takes, it is not the content of the rule as such that expresses one's unconscious knowledge but, instead, that there is a rule of such-and-such content that is applicable to this musical situation. Perhaps this distinction between, if I may so put it, the rule as knowledge and knowledge of the applicability of the rule doesn't really matter, and maybe both are supposed to be propositional knowledge; but I am going to proceed on the assumption that what is being claimed is that each of us has, unconsciously and innately, a storehouse of knowings-*that* that are relevant to how we hear music.

What is it to know *that* something is the case? And how is an answer to that question applicable to the issue of whether or not we have, or could have, innate musical knowledge? The most common answer to the first question, at least among so-called analytic philosophers, is what both its advocates and some of its critics call the *theory* (I would call it either stipulation or anthropological report) that knowledge is *justified, true belief*. We need not enter what to my view is the overblown, self-deceptive, and unfortunately voluminous literature on this topic to extract from it the crucial notion of *justification* for the issues at hand. For empiricism and rationalism were and are theories not only about the sources of, but also the justifications for, our human knowledge.

Assuming then that what Lehrdahl and Jackendoff call unconscious knowledge can be expressed as certain *beliefs* a person has, I think we should grant immediately that there is nothing in the nature of things that prevents the possibility of there being such kinds of beliefs, even if we grant,

with one form or aspect of empiricism, that all *simple* ideas come from sense experience and introspection. For if we, perhaps unlike the early modern philosophers, make a sharp distinction between terms and propositions (to speak in one traditional way), we may agree that until we have experience of what is referred to by the terms of the propositions, we don't know what we are talking or thinking about; but that having such experience may then, as it were, "turn on" beliefs embodying those terms, which beliefs then affect subsequent behavior. And that is the idea at work here: the organism behaves as if it believes such-and-such; it doesn't have any conscious beliefs of that kind, so it must have unconscious beliefs of that kind.

And here, perhaps, my skepticism that these innate structures are best considered as consisting in part of beliefs begins to show. Or, perhaps better said, I am inclined to say that the notion of unconscious belief is better restricted, as it was originally, to those situations in which a person's behavior is best explained by the ascription of a belief (or what is more likely to be called a memory, but memories embody beliefs) that is contrary or contradictory to what the person consciously believes. And, as is obvious, this is quite unlike the case of "unconscious knowledge" we may bring to music.

But the main point I want to make, in closing this section of this paper, is that the more important claim of empiricism—that beliefs about the world can be *justified* only by experience of the world—remains untouched by any findings of the sort that could confirm Lehrdahl's and Jackendoff's theories. Perhaps this thesis is more easily seen to be true in the more familiar case of language: if the relevant innate beliefs are to the effect that one's utterances in the language of one's parents, say, must conform to certain structures in order to be recognized, understood, and "approved" by them, then while, on the theory, those beliefs are in fact true, a person could be justified in believing them, even if only unconsciously, by *observations* that the requisite connections hold between structures and understanding. It is, ultimately, itself an empirical question as to how we come to have the beliefs we do have and whether or not any beliefs we have are, as it were, in our genes. But it is a philosophical question as to what, if anything, could make one justified in holding this or that (kind of) belief. And on this matter neither Chomsky nor Lehrdahl and Jackendoff have given us any reason whatsoever to abandon the empiricist's criterion for knowledge and thus the conclusion that, in this strict but important sense of justification, there is not, and could not be, any innate knowledge of music or language or, for that matter, anything at all. This conclusion does not in the least deny the importance of Lehrdahl's and Jackendoff's findings nor those of any other researchers in the field of the innate basis of our musical life. In short, and possibly contrary to the beliefs—maybe unconscious—of some

philosophers, the empiricist with respect to justification can be an innatist to whatever degree the findings of empirical science may dictate.

There is another kind of knowledge in addition to knowledge-how and knowledge-that; namely, knowledge-of. This is the kind of knowledge we gain through *acquaintance* with something—either directly by sense experience and inner awareness or indirectly by having the object represented to us in some way. This kind of knowledge seems obviously irrelevant and indeed almost definitionally so as to the question of knowledge-for music. But, in elaborating on ideas I have put forth in a recent book (1999) in the pursuit of the issue of knowledge-from music, it is exactly a certain sort of knowledge-of with which we shall be concerned. In particular, I want to consider the possibility that we can gain knowledge of certain moods and emotions by having them represented to us by music. We can use Lehrdahl and Jackendoff in order to get into the issue in this way: While acknowledging their debt to Chomsky's theories, they are also eager to stress certain important disanalogies between musical and linguistic theories in maintaining that ". . . whatever music may "mean," it is in no sense comparable to linguistic meaning; there are no musical phenomena comparable to sense and reference in language or to such semantic judgments as synonymy, analyticity, and entailment." (p. 5) While this sentence may be consistent with some theories according to which music represents something extra-musical to the listener, these words with those that follow in their text seem to cast doubt on this possibility or likelihood by emphasizing, correctly, that music is not, in any literal sense, a *language*. But of course, we know that many things that are not language—from flags and paintings, maps and religious icons, gestures and looks, and much, much more—represent and symbolize to the human mind. So the mere fact that music is not language leaves completely open the question of whether or not it represents and, if so, possibly gives us knowledge of that which it does represent.

Probably the best known defender of the theory of music as representation—or what she more often called symbolization—is the American philosopher Susanne Langer. And she was eager also to maintain also that music can represent what language cannot, as the following passages from her best-known book, *Philosophy in a New Key*, indicate:

... it seems peculiarly difficult for our literal minds to grasp the idea that anything can be *known* which cannot be *named*. (p. 232) What is here criticized as a weakness [music's not having certain features of

language], is really the strength of musical experience: that *music articulates forms which language cannot set forth.* (p. 233) The imagination that responds to music is personal and associative and logical, tinged with affect, tinged with bodily rhythm, tinged with dream, but *concerned* with a wealth of formulations for its wealth of wordless knowledge . . . (p. 244)

Langer's *ineffability* thesis—that of “wordless knowledge”—is not essential to my argument although, as it happens, I do hold a version of it myself. What is essential is the thesis that we can gain knowledge from music of something that is not music, whether or not that knowledge might be gained or represented in other ways. Theories of the sort we have been considering in the first part may well tell us *how* we listen to music while also telling us something about human nature, but they have little or nothing to say about the *why* of the matter. Lehrdahl and Jackendoff said they were not concerned with the affective, that is, the emotional, side of music, and rightly so given their concerns. But as to the question itself, my broad thesis in a nutshell is that we listen to music because doing so *arouses* emotion in us; and it arouses emotion because it *presents* us with emotion (though not necessarily or even usually the same emotion), that is, it represents emotion and thereby gives us knowledge of what some emotional states are. The question is how this representation might be accomplished, through what ground and mechanism.

But let us ease ourselves into this matter by asking yet again why music matters so much to human beings? Why, to speak more precisely in one dimension, is it *sounds* and not visual or kinesthetic or any other kind of sense or intellectual “data” that, at least among artworks, affects humans more widely and more profoundly than any other? Why or how, to speak more precisely in another dimension, have there come to exist beings who are willing to spend so much of their time and resources on music and many of whom are content to sit for hours on end, virtually silent and motionless, for the purpose of listening to, and watching, performances of music?

Surely there must be something interesting about our human nature, as produced by evolution, and something interesting about the nature of sound, at least as it presents itself to awareness, that are relevant to any full answer to these questions. But it is clear that the evolutionary part of the answer, whatever it is, cannot by itself fully answer the question if only because it involves no investigation into the nature of sound. Nor can it be adequate to suggest that we humans just happen to enjoy music; for the empirical absurdity of treating the relation between human beings and music as mere “stimulus/response” is attested to, or at least strongly supported by, numerous facts: among them that most pieces of music involve consciously

constructed and perceived structures of a certain sort; that listening to music requires effort and attention and memory of sorts that may reasonably be called *cognitive*; that the pleasures of music are, while occasionally also physical, for the most part of a sort difficult to categorize or characterize but that certainly involve the *appreciation* of certain, often complex properties of the music one is hearing; and that in talking about music, we use the language of the emotions and other aspects of mental life to characterize the music itself.

Langer's theory, according to which music *symbolizes* the emotions by virtue of a shared logical form, I believe to be substantially correct—as far as it goes. But neither Langer nor any previous thinker has explained how it is that sounds might have this symbolic capacity. More generally, no one yet has embodied this idea in theories of the nature of representation, the nature of sound, and the nature of consciousness in a way that would explain just why it is sounds and not other phenomena that affect us as music does.

My one-sentence version of the general theory is this: *Passages of music are quasi-natural representations of emotions and other states of consciousness.* Consciousness figures in this theory, as in Langer's, both as what is represented by music and as what is represented to, by music. Thus a theory of the nature of consciousness would seem especially called for by any such account. And because it is sounds that are doing the representing, some theory of their nature would seem also to be relevant. But on this occasion, and in keeping with the emphasis on cognitive science, I shall focus on the nature of representation, having, in the end, to take certain assumptions about consciousness and sound for granted.

Quasi-natural representation, as I call it, is to be distinguished on the one side from purely conventional representation in which it is entirely a matter of choice (usually the “choice” of the linguistic community) what represents what, and on the other side from purely natural representation in which the representing entity, by its inherent nature, points to what it represents. Language is the best example of conventional representation and consciousness itself (or some constituent of it) is probably the only example of natural representation. And while natural representation is the fundamental form of representation as that on which, in different ways, all other forms depend, quasi-natural representation is the most complex and, especially if it exists, probably the most interesting form of representation.

Considering only the human case, we may say that there is quasi-natural representation if, *due only to the natures of the representation and of being human*, some kind of entities do represent something in particular to human beings. Thus, this is a kind of representation that is beyond choice to change although, as always, what does represent in this way, if anything, can always represent in the conventional way by being stipulated to represent something

or other. In short, in quasi-natural representation, the fact that something represents something else to a human being is a *law of nature* (or an instance of a law). It might well be argued that human nature is always involved in representation as well as the nature of the representation at least to the extent that the representation, if it is to be such in any systematic way, must be of a sort that is easily perceivable by human beings, something that we can easily manipulate, and so on. I have no objection to the idea that there is a continuum and not a sharp line between conventional representation and quasi-natural representation; for it is surely the case, as Chomsky has impressed on us, that, due to human nature, there are limits at least on the forms that language can or will take, to mention only the most important case. And it will probably not be doubted that the fact that humans have such extensive conventional systems of representation at all is due to, and importantly expressive of, our human nature.

Even if it is a truism that all known representation depends, in some way, on the nature of the human mind, the distinction between conventional and quasi-natural representation is not thereby rendered vacuous. To see this more clearly, let us understand that in the strict sense quasi-natural representation must involve the possibility of being represented to whether or not the person is consciously aware of the fact of such representation. This fact is for many a reason to dismiss the notion immediately as either logically or empirically absurd. For, as defined, if someone is perceiving something that by its nature represents something to any human being by our nature, that person is, *ipso facto*, being represented to whether or not that person knows or suspects that representation. What this could possibly mean exactly remains to be explained, nor can I do so on this occasion. But it may help to suggest that the best-known case of what may be a kind of quasi-natural representation, that of dreams, would seem to *require* just this perplexing phenomenon of being represented to without conscious awareness of it. And I do mean by that not just that the person had the sensory awareness of something that sometimes brings something to mind in someone but that that something was actually brought to mind in that person even though he or she was not consciously aware of that fact. In any case, this feature distinguishes the notion of quasi-natural representation from representation in language in which some analogous phenomenon *may* occur but is not required by the very notion of language itself. And it will be well to keep in mind that the evidence that a person has been represented to even while not knowing or suspecting or even while denying such a representation is that it is the *best explanation* of that person's actual and dispositional behavior.

Quasi-natural representation, like conventional representation, is a minimally *three-term* relation involving the representation itself, the

represented, and the person represented to. Whatever isomorphism or resemblance may exist between the entities that are the representation and "entities" (they may not exist) that are represented, there is no simple or natural, that is, *two-term* relation between the former and the latter. The one represents the other only *to* or *for* someone in some way *because* of the human mind—the mind as *intermediary*, in a proper but broad use of that word—although here because of its *nature* and not its *will* or *choice*.

How is it, then, that *sounds* and perhaps sounds alone, can be, for human beings, quasi-natural signs of certain states of consciousness such as the having of moods and emotions? I suggest that *part* of the answer to that question—here to be only asserted and not argued—is that sounds and awarenesses have a certain *ontological affinity*.

But to see briefly what that might mean, consider, first, that it seems to be the case that, *alone among physical phenomena known to us, sounds require duration but do not require change*. Or, to speak a little more precisely: in the physical world, the only temporal property that does not require change is that of *being-a-sound* and whatever "other" properties that involves such as pitch, timbre, and volume. The exemplification of any other physical temporal property such as *being-a-birth* or *being-a-revolution* requires not only duration but change as well. This gives sound a very special ontological status in the physical realm, but I don't know how to prove that it is so beyond asking you first to consider the nature of the property of *being-a-sound* and then to try to think of some other physical property that shares this feature with that property, believing, of course, that you cannot succeed in the latter.

If this ontological feature of requiring time but not change is unique to sound in the physical realm, it is not unique in reality as a whole. Or, at any rate, I now submit that states of consciousness are also such that they require time but not change. This feature of consciousness states (which, following the likes of Husserl and Sartre, I take to be the same as *intentional* states) I have argued for in detail in two books (1989, 1999), but I am by no means the first to suggest that there is a profound connection between consciousness and time. At any rate, here I must simply assume this feature of conscious states as established.

We have thus come upon a profound *ontological affinity* between consciousness and sound: *states of consciousness and sounds alone are such that, while they require time for their existence, they do not require change*. This affinity that sets them apart from everything else in this crucial regard suggests that, so to speak, consciousness might find in sound an "image" of itself, not just in the feature that I have identified but in more complicated ways as well. This is the ontological basis of my thesis that passages of music are quasi-natural representations of possible states of consciousness.

What I cannot do on this occasion is to argue, instead of merely claim, that the theory that music in fact *represents* the emotions to us is the *best explanation* of why music *arouses* emotion in us, and also of why, what is quite a different fact, we spontaneously use the language of emotion in talking about the music itself. Nor, alas, can I show, instead of merely assert, the intelligibility of supposing that much of this representation takes place through unconscious awareness where by 'unconscious awareness' I mean occurrent states of consciousness which the person does not recognize him- or herself as having and may even deny having. There is surely no serious doubt about the existence of the phenomenon of unconscious awareness but only in what kinds of situations it takes place and in what modes and with what objects. I believe we will have a better understanding of the importance that music has for our species if we take seriously the possibility of both the conscious and the unconscious awareness of things that are not music that are, as it were, forced on us by listening to music.

Finally, in suggesting that parts of the mind that are not part of our fully conscious existence play important roles in both what we bring to music and what we get from music, I hope slightly to have advanced the understanding, empirical and philosophical, of how it is that music has such power and mystery for human beings.

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EVENT COREFERENCE AND DISCOURSE RELATIONS

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Abstract: Event coreference is largely ignored in works on coreference as well as in works on temporal order in discourses, in which temporal relations between two eventualities e_1 and e_2 always suppose that $e_1 \neq e_2$. However, event coreference is not an uncommon phenomenon. We show that it is the keystone on which at least four types of discourses are based: on the one hand, particularizing and generalizing discourses, which can be viewed as special cases of elaboration and reformulation discourses respectively, on the other hand causal discourses in which the effect is expressed by means of a causative verb, which are generally analyzed as explanation or result discourses. Descriptions and linguistic analyses of these discourses allow us to present unusual linguistic phenomena (e.g., coreference between existentially quantified elements, or assymetrical behavior of explanation or result discourses). The discourse relations involved are examined. This leads us to introduce and define new discourse relations. It also sheds a new light on the discourse relations Explanation and Result.

1. INTRODUCTION

Works on temporal relations between two eventualities e_1 and e_2 examine almost exclusively if one eventuality precedes, includes or overlaps with the other one (Moens & Steedman 1988, Asher 1993, Pustejovsky 1995). All these temporal relations suppose that $e_1 \neq e_2$. We will concentrate on cases where $e_1 = e_2$, i.e., on *event coreference*. Event coreference can be seen as a particular case of either event elaboration or event reformulation, for which