WHAT CAN MUSIC TELL US ABOUT THE NATURE OF THE MIND?
A PLATONIC MODEL

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ABSTRACT

We present an account of the phenomenon of music based upon the hypothesis that there is a close parallel between the mechanics of life and the mechanics of mind, a key factor in the correspondence proposed being the existence of close parallels between the concepts of gene and musical idea. The hypothesis accounts for the specificity, complexity, functionality and apparent arbitrariness of musical structures. An implication of the model is that music should be seen as a phenomenon of transcendental character, involving aspects of mind as yet unstudied by conventional science.

Keywords: music, self-organisation, universal mind, Platonism

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Music and the Nature of the Mind

Is the phenomenon of music to be understood in conventional biological terms, or is it instead an activity dependent upon subtler aspects of mind? Conventional explanations may be able to explain certain capacities in music (such as the ability to recognise and define particular categories of pattern, structure or relationship), on the basis of the fact that possession of such abilities may confer selective advantages. What is more difficult to account for, using such arguments, is the specific forms that appear to be favoured in music, and which appear to possess a curious generative capacity or 'fertility' not possessed by arbitrary patterns of sound. Specifically, one often finds at the beginning of a piece of music a short and usually discrete unit (typical examples being the first theme of Mozart's Symphony No. 40, the opening bars of Beethoven's String Quartet Op. 95 and, on a larger scale, the leitmotif which begins Wagner's opera Tristan und Isolde), containing distinctive harmonic, melodic and emotional patterning, which functions as the germ of elaborations in the course of the subsequent development. The fertility of such special forms or musical ideas is emphasised by the way a composer may develop an existing idea in a new way (cf. Schubert's use of the initial idea in Mozart's String Quintet in C major in his own String Quintet in C). These 'musical ideas' resemble the memes of Dawkins (1989). It will be argued here that the specificity of these forms cannot be readily accounted for within conventional frameworks of explanation, and that better explanations are likely to be obtained by involving subtler aspects of mind than those normally taken into account.

The phenomenon of interest can be defined as the special effects on consciousness of the specific constituent patterns or ideas found in good music, the striking effects of the latter being in clear contrast to those of the forms created by mediocre composers or by mechanical procedures. Skilled composers do not produce innovations in a mechanical way; rather they appear to possess an intuitive ability to be aware of the creative potentials of particular patterns of sound even when considered in their most elementary forms, and then develop a composition from these 'germs' (cf. Schoenberg 1977, 1984).

At a superficial level, the specificity that has been discussed resembles that of a resonance, but this analogy does not appear to be a very helpful one since we are dealing with a highly non-linear system; the true mechanism must be rather different in nature. We shall dismiss explanations based on conditioning, because the differences in style between an innovative composition and music that a listener has been exposed to previously account for a considerable part of its interest, and while conditioning can account for a listener's ability to process competently a new piece of music in a familiar style it cannot explain why particular innovations should have particularly powerful effects. Apart from this there are two main categories of possible explanation:

1) genetic explanations, to the effect that for each musical idea there is a corresponding gene coding for nervous system structure corresponding to selective sensitivity to that idea. Regarding this type of explanation, while some musical ideas may have correlates in the natural world, the majority do not, so that there would be no selective advantage in possessing such sensitivity. It also seems unlikely that the collection of sensitivities to musical ideas can be explained as accidental consequences of other adaptations. It seems to us that the only way of avoiding these problems would be to postulate that during the course of evolution there had been a species that used as a means of communication music very similar to the kind produced by human composers, and which had undergone a process of evolution that was the genetic equivalent of the human cultural evolution of music, by this means evolving genes corresponding to the musical sensitivities that have been postulated. This seems unlikely to have been the case.

2) 'theory of everything' type explanations: the idea that there may be some universal formula or principle that distinguishes effective musical ideas from ineffective ones (in the same way as in the case of chemistry there is a universal formula, viz. Schroedinger's equation, that can distinguish between stable and unstable molecules). A related perceptual mechanism would provide the observed discrimination between good music and bad.

Attempts have been made by musical psychologists (e.g. Lerdahl and Jackendoff 1983, Narmour 1990) to discover such principles, but these attempts seem to us, in their present stage of development, grossly inadequate to the purpose, and to provide us with little illumination concerning the problems addressed here. There is in addition a further argument against 'theory of everything' type explanations of musicality. This kind of explanation, in contrast to the other kinds of explanation discussed (viz. cultural and genetic explanations), allows essentially no scope for arbitrary factors to enter into the determination of the preferred forms. Given the apparently capricious nature of musical regularities, the kind of explanation that does

allow arbitrary factors to enter seems considerably more plausible.

While none of the above arguments is conclusive, the difficulties we have been noted provide some motivation for seeking alternatives. Elsewhere (Josephson and Carpenter 1994) the authors have commented on the existence of interesting parallels (principally involving matters concerning information and regulation) between aesthetic processes and life processes. These parallels will now be developed further.

In the present context, the most basic parallel is that between effective musical pattern and gene, both being informational structures playing a key role in the activities of those structures that contain them (organism and musical mind). In the case of life, the genes help to determine the forms and activities of the structures that cause the genes to be replicated so that they survive. Particular gene structures generate particularly effective functional systems, and this very often entails high complexity since complex means are generally needed to produce simple results in an effective manner. Other contributions to complexity come from the complexity of the chemistry involved and the fact that genes often do not produce their effects in isolation. Further, in organisms there are clear means-end relationships related to the functionality of structures, by virtue of which the functional structures can be considered 'significant'. In contrast to the perspicuity of the processes involved at the functional level, the details at the structural level are complex, and related to function in a complex way, which generally has arbitrary aspects as a consequence of the way that nature operates opportunistically rather than logically.

We now observe the ways in which music possesses features paralleling those discussed in the case of life:

(i) effective musical structures are highly specific, as well as being (subjectively) functional;

(ii) while there is an overall logic behind the way that a given piece of music works, many of the details of form appear essentially arbitrary. The functional descriptions are considerably simpler than descriptions at the detailed level of the structure.

A further fact about music that is clarified by this picture is its perceived semantic aspect. Biological structures in general can be considered to have a semantic connected with means-end relationships. These semantic aspects can be divided into internal ones (related to direct maintenance of the organism independent of its environment) and external (maintenance dependent upon interactions with the environment). Correspondingly, in the case of music, some components appear to have external reference (that is to say they appear to relate in a general way to ordinary events in the world) (Meyer 1959), while others appear to be significant only in relation to the piece of music in which they appear.

These features of music could be understood if the mode of operation of mind were in general terms similar to that of life. According to this view, intelligence would be the product of a collection of adaptations capable of being specified by a coding system related to that of music. The fertility of particular musical patterns would reflect the operation of the specific adaptations specified by these patterns. Individual minds would make use of such adaptations in the same way as in ordinary biology individual organisms make use of genes. While the development of the organism, excluding mind, centers around the use that can be made of chemistry, the development of mind centers around the use that may be made of ideas and thought.

The question arises, which is the mind-system in which the processes we have been discussing occur? It cannot be the minds of individuals, since the preferences that the model is intended to explain are not those of individuals. Neither can it be the cultural mind (consisting of individuals communicating with each other musically) because, as discussed in connection with explanations based on conditioning, the selective response to innovations cannot be explained purely culturally. What remains is activity involving some kind of collective or universal mind. Our model thus entails a Platonic picture of the mind, where much of the intelligence of the individual is the consequence of preexisting ideas in some mind-sphere. It follows that the study of music is at the same time the study of the quasi-genetic aspects of this subtler realm of mind. Such studies may thus be able to inform us of aspects of mind not accessible to conventional studies that tend to focus on the more intellectual aspects of mind to the exclusion of its more intuitive ones. It may be worth pointing out here also that the idea that there is a fundamental connection between sound and form is an ancient one, dating back thousands of years in the Eastern philosophical tradition.

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REFERENCES

Dawkins, R. 1989. The selfish gene. Oxford: Oxford University Press.

Josephson, B.D. and Carpenter, T. 1994. Music and Mind -- a Theory of Aesthetic Dynamics: On Self-Organization (Springer series in Synergetics Vol. 61): Heidelberg: Springer, 280-7.

Lerdahl, F. and Jackendoff, R. 1983: A Generative Theory of Tonal Music. Cambridge, Mass.: MIT.

Meyer, L. B. 1959. Emotion and Meaning in Music. Chicago: University of Chicago Press.

Narmour, E. 1990. The Analysis and Cognition of Basic Melodic Structures: the Implication-Realisation model. Chicago: University of Chicago Press.

Schoenberg, A. 1977. Fundamentals of Musical Composition. London: Faber and Faber, chapter III.

Schoenberg, A. 1984. Folkloristic Symphonies. Style and Idea: Selected Writings of Arnold Schoenberg (ed. Leonard Stein). London: Faber and Faber. 161-166.