CHAPTER 1

# THE NATURE OF MUSIC AND ITS EVOLUTION

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## The Theory of Evolution in Musicological Context

The idea that the theory of evolution has anything to offer to our understanding of music provokes strong reactions (both positive and negative) and has swung in and out of favor amongst those who have thought and written about music over the last 150 years. For the last few decades of the nineteenth century and the first few of the twentieth, the theory of evolution was of huge significance for music theorists, historians, and anthropologists as a means of exploring and explaining musical change, musical difference, and musical value. From around the 1940s to the beginning of the 1990s, the theory of evolution more or less vanished from musical and musicological discourse; the term "evolution" tends to co-occur with musical terms only in the titles of books and articles such as "The evolution of twelve-tone music," " … of Beethoven's late style"—and so on. But from around the late 1980s, the theory of evolution began to re-emerge as a valid and prospectively valuable way of thinking about important aspects of music. This chapter will outline aspects of "classical" evolutionary theory before delineating some of the factors that have led to the fall and rise in the fortunes of evolutionary theory as applied to music. It will summarize current conceptions of the relationships between music and evolutionary theory, and will conclude by exploring some of the implications for music psychology of evolutionary views of music.

Dictionary definitions of the term "evolution" include "the appearance of events in due succession," and "the gradual development of something into a more complex or better form." Only with the publication of Darwin's *On the Origin of Species* in 1859, did the meaning in terms of which "evolution" is now most widely understood take clear shape: "the theoretical process[es] by which all species develop from earlier forms of life." "Classical" evolutionary theory starts by noting that not all members of any given population of animals will be identical; there will be minor differences of form and capacity between individual members, and if those differences allow an individual to exploit its environment better than

other individuals, they will increase the likelihood that the individual will survive and reproduce. If those differences can be inherited, all members of the population that bear them will be similarly advantaged by being better adapted to their environment, becoming prevalent in the population over time, and leading to a change in its makeup and perhaps to speciation, the emergence of new species (roughly speaking, a discrete population of animals that do not interbreed with other populations of animals). This process of variation, leading to differential levels of survival and reproduction, leading to speciation, can be termed "natural selection." Natural selection, together with sexual selection (evident in processes governing mate choice and hence affecting likelihood of reproduction) constituted the foundations of Darwin's theory of evolution, which was intended to provide an explanation of the diversity of forms of life and their interrelationships without invoking any creative agency other than the workings of observable physical and biological processes.

The theory of evolution was developed to account for the natural world, but was almost immediately co-opted into theory and debate about human society. For many it appeared to offer a scientific basis on which to erect social theory, particularly insofar as it could be interpreted as giving support to ideas of scientifically grounded distinctions between human races, and of the progressive development of human societies. After all, it seemed to many influential thinkers that the processes of evolution constituted a means of explaining the continual refinement of a species' abilities. What could be more natural, in the Victorian age of progress, than to suppose that differences in degrees of ability between species—with human races interpretable as distinct species, or at least, as being analogous to species—conformed to universal principles that could be summarized in the theory of evolution? With these teleological trappings the theory of evolution came to serve as one of the key features of much writing about music at the beginning of the twentieth century. This "progressivist" notion of evolution, derived from the ideas of Herbert Spencer rather than those of Darwin (see Rogers, 1972), seemed to provide a systematic framework that could account not only for stylistic change and development in music across Western musical history, but also a means of qualifying music from non-Western societies as being more, or less, developed in their relationships to refined and hence "highly evolved" Western musical practice (for an overview, see Rehding, 2000).

It should be noted that Darwin's own writings (in *The Expression of the Emotions in Man and Animals* and in *The Descent of Man*) on music as an evolved human capacity played almost no role in any of the early twentieth-century musicological writings that espoused evolutionary perspectives. Darwin viewed the human capacity for music as a likely precursor of the capacity for language, having its origins in the vocal expression of emotion and as having had utility in processes of sexual selection (see Cross, 2007). Moreover, he was somewhat agnostic concerning whether or not music of different cultures or races had greater or lesser value, but in any case did not agree with the proposition that racial difference corresponded to any difference in innate, human, musical capacity; in other words, humans, to Darwin, were a single species (see chapters 7 and 19 of *The Descent of Man* (Darwin, 1874/2004).

As the twentieth century progressed, consideration of origins in the study of music moved away from any exploration of music's relationship to biology to refocus on the historical relationships between contemporary Western musical theory and practice, on Western musical history, or on music's relationships with abstract domains such as mathematics. For these strands of thought, evolution was simply irrelevant to their interests which were viewed as primarily musicological, concerned with the explication of the historical and ontological

roots of Western music. Moreover, the repellent consequences of the racialist theorizing that teleogical interpretations of evolutionary theory had been called upon to sanction were all too evident in the aftermath of World War II.

In addition, within anthropology, an increasing tendency to focus on the cultural specificities of societies rather than on pan-cultural universalities or on any necessary concept of cultural progress diminished the apparent explanatory role of any biological foundation for culture and mind (see Shore, 1996). By the middle of the twentieth century, exploration of music beyond the bounds of Western societies had come to concentrate on detailed ethnographic description and on attempts to understand the structures and functions of music in terms derived from societies' own understandings of their music: in other words, in emic rather than etic terms. Nevertheless, a vital feature of ethnomusicological studies is the evidence they provide concerning the heterogeneity of music across different societies, a heterogeneity that problematizes the very notion of "music" (see Clayton, Chapter 4, this volume). And *contemporary* evolutionary approaches to understanding music—free of progressivism, and unencumbered by cultural constructs such as "race"—require at least an operational definition of what might constitute "music" that can take account of this heterogeneity.

Evolutionary theory is first and foremost a theory about biology. It can be suggested that biology has no explanatory value for music, taking the position that "music" is simply a social construct: a discursive category with an identity dependent on its opposition to the other categories of discourse that we employ in the linguistic taxonomies that we have developed—largely in the West—to describe or talk about types of human behaviors. This is a view implicit in much recent and current musicological thinking (see, e.g., Korsyn, 2003, p. 187). However, most ethnomusicologists would subscribe to the view that there is something that can be described as "musical" that is evident in the patterns of thought and behavior of all known societies (see Wachsmann, 1971; and Stevens and Byron, Chapter 2, and Clayton, Chapter 4, this volume). If this is indeed the case, given that humans share a common biology as members of a single species, then whatever constitutes "music" across cultures may reflect some general processes of thought and behavior that should, in principle, be a proper focus of exploration in terms of evolutionary theory.

## "Music" as an Object of Evolutionary Exploration

Music varies from society to society to the extent that one culture's music may not be recognizable as music by members of another culture. This applies both to the structural features of the music and to the functions that it may fulfil. As Stevens and Byron show in Chapter 2 in this volume, the cognitive processing of music across human societies exhibits many common characteristics. Some of these processing commonalities map onto structural musical features, such as the use of discrete pitch levels, unequal-stepped scales, octave equivalence, low-integer frequency ratios, and periodic pulses. Moreover, features such as hierarchical organization, and temporal structures that are shaped so as to modulate the expectancies of those engaged with the music, also appear to be generic in music across cultures. It may be that some features, particularly those concerned with the experience of fine-grained

pitch structures and periodic temporal structures, should be considered as proper to music. Nevertheless, at least some of these common structural regularities may not be evident in particular instances otherwise identifiable as music (a paradigmatic, though controversial, case being Cage's *4′33″*), and at least some of the universal cognitive processes described by Stevens and Byron, such as the formation of hierarchical structures, and the implicit learning of expectancies, are operational in domains other than music. While arriving at an empirically grounded account of universal characteristics of musical processing and musical structure is essential in delineating what may constitute the foundations of music, it is not sufficient; it is also necessary to explore the extent to which there may be commonalities between people and across cultures in the ways in which music is manifested as social behavior.

On the whole, ethnomusicologists have given surprisingly little consideration to the question of musical universals. Amongst the few significant exceptions are Bruno Nettl, Alan Merriam, and John Blacking, who adopt somewhat different perspectives. Nettl (2005) takes a pragmatic approach, suggesting that etic (Western) and emic accounts should each feed in to determine what it is that ethnomusicologists should focus on as "music." Merriam (1964) suggests that "music" can best be explored in terms of a tripartite model that embraces music as *sound* (what might conventionally be thought of as constituting music from a Western perspective), as *behavior* (which embraces the musical—and "non-musical"—acts of musicians, and the activities in which the production of music is embedded) and as *concept* (how people think about music in terms of its powers and its relations to other domains of human life). Blacking (1995), on the basis of his extensive fieldwork with the Venda peoples of southern Africa, and in particular, on his study of Venda children's music, claims that " 'Music' is a primary modeling system of human thought and a part of the infrastructure of human life. 'Music'-making is a special kind of social action which can have important consequences for other kinds of social action." (Blacking, 1995, p. 223).

Blacking's claims appear to locate music as central to, and in some ways indissociable from, other domains of human behavior. While the claim for music's centrality is not widely echoed in the ethnomusicological literature, the idea that music cannot be understood in isolation from the contexts within it occurs is more generally accepted; as Bohlman (2000, p. 293) puts it, "expressive practices do not divide into those that produce music and those that produce something else, say ritual or dance. Music accumulates its identities … from the ways in which it participates in other activities." For those engaged in understanding music across different cultures and historical times, "music" appears to be protean, and its identification in any consistent manner seems particularly intractable. Certainly, music cannot simply be defined as a consumable commodity constituted of complexly patterned sound that is produced by a class of specialists and engaged with through listening for primarily hedonic reasons—the contemporary Western folk-theoretic notion of music. In many, perhaps most, non-Western cultures it involves overt action and active group engagement, and is employed in caregiver–infant interaction, entertainment and courtship, and in ritual, particularly at times of significant life transitions (such as the passage from adolescence to adulthood, from season to season, or from life to death). More often than not, music is an integral part of a wider range of everyday social activities. If a category of behaviors that can be termed "music" has any generality across cultures, it seems that it can best be characterized as active, as foundationally interactive and social, and as permeated by—and as permeating—many other aspects of social life (see also Clayton, Chapter 4, this volume); in other words as a participatory rather than a presentational medium (see Turino, 2008).

Given that, in the ethnomusicological view, music and other human activities seem almost amalgamated, are there any features that would serve to distinguish "music" as a discrete category of human thought and behavior? At first sight, music seems to possess few characteristics that are not shared with other domains of behavior, notably dance and language. Music involves patterned action in time, as does dance. Music appears communicative, complex, generative, and representational, as does language. The concept of music is amalgamated with that of dance in many—perhaps the majority of—cultures. This fact, together with the stress on music as action in much of the ethnomusicological literature (see Stevens and Byron, Chapter 2, this volume) suggests that it would be parsimonious to treat music and dance either as intrinsically related or simply as different manifestations of the same phenomenon.

Relationships between music and language are more difficult to disentangle, but perhaps the most significant factors that differentiate them are the types of structured interactions that they allow, and their contexts of use. Linguistic interactions are typically structured in time so as to coordinate the temporal succession of participants' contributions. Language possesses a generative complexity that allows for the production and reception of a potentially unlimited set of utterances. And language is directed toward the communication of representations of ideas, states of affairs, attitudes, and affects that have relevance to their contexts of production and reception—language can signify or mean, unambiguously. While music seems to share some of these characteristics with language, at least two significant differences are apparent. Music may allow participants to act simultaneously rather than asynchronously as in language. In addition, music's meanings appear less stable and consensual than those of language (see Cross and Tolbert, Chapter 3, this volume).

Music's capacity to enable participants to act and to contribute to music-making simultaneously is rooted in processes of entrainment (Clayton, Sager and Will, 2005). Entrainment here refers to the coordination in time of one participant's behaviors with those of another and involves the organization of the perception and behavior of participants around temporal regularities that are inferred (generally nonconsciously) from musical sounds and actions in the form of a periodic pulse or beat that is sensed by all participants (Clayton et al., 2005), being evidenced in continual processes of correction of errors by participants in alignment of action in both period and phase (see, e.g., Himberg, 2013). Even engagement with music in apparently passive listening appears to rely on such entrainment processes, evidenced in periodic modulation of attentional load (see Jones, Chapter 9, this volume). It is notable that the capacity for behavioral entrainment—or perhaps the motivation to entrain—may be unique to humans; while several nonhuman species do appear to entrain, at least some of these species do so in ways that are different from those implicated in human entrainment, and the issue of the origins of entrainment in the hominid or hominin lineage remains to be clarified (see Bispham, 2006; Zarco, Merchant, Prado and Mendez, 2009; but see also Lakatos et al., 2013; Patel, 2014).

Language has an indisputable efficacy in human interaction, in large part by virtue of its capacities to mean. It is often supposed that music's meanings can be reduced to the emotions it represents, expresses, or elicits (see Juslin and Sloboda, 2010) which suggests that meaning in music is a poor or natural cousin of meaning in language. However, while it is undoubtedly the case that music is valued for its affective powers in all societies, music's meanings extend beyond its affective value; as Tolbert (2001) notes, music's meanings are equally embodied, natural or affective, and artificial or symbolic. In general, however,