Screech, Hoot, and Chirp: Natural Soundscapes and Human Musicality

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Abstract:

The earth is not a silent planet. It is filled with an immense variety of geophanies (the sounds of inanimate nature such as waterfalls, thunderstorms, and wind) and biophanies (the sounds of animals). These sounds of nature are at once both familiar and mysterious. A group of scientists and musicians engaged in the BioMusic Project has gathered to consider the music of nature and the nature of music. The BioMusic mission statement is "To research musical sounds as a basic ingredient in the intuitive, nonverbal processes of communication, to expand our definition of music, to enlarge our view of its role in biodiversity and human development, and to create appropriate attitudinal changes" (http://biomusic.org). The BioMusic Project has a number of implications for music psychology as a number of questions are being considered: What is music? Do only humans have music or do some animals have music, too? Why are we (humans) musical? What are the similarities and differences between human music and animal soundmaking? What are the influences of biophonies and geophonies on human music? Conversely, what is the impact of anthrophony (human sounds, including music) on biophony? How do human sounds impact natural soundscapes? Answers to all these questions and many others have profound implications for music psychologists who are trying to explicate the phenomenon of the human musical experience.

Article:

BACKGROUND

The earth is not a silent planet. It is filled with an immense variety of geophanies (the sounds of inanimate nature such as waterfalls, thunderstorms, and wind) and biophanies (the sounds of animals). These sounds of nature are at once both familiar and mysterious. We have all heard many animal and nature sounds either in the wilds or at least on television. But perhaps many of us have not stopped to consider how these natural soundscapes and human musicality intersect. A group of scientists and musicians engaged in the BioMusic Project has gathered to do exactly that: to consider the music of nature and the nature of music. The BioMusic mission statement is "To research musical sounds as a basic ingredient in the intuitive, nonverbal processes of communication, to expand our definition of music, to enlarge our view of its role in biodiversity and human development, and to create appropriate attitudinal changes" (http://biomusic.org). Some of the objectives of BioMusic are:

- To research and reveal the linkages between musical sounds in all species.

- To explore, exploit, and expand the vast and varied aural interfaces and interactions within and between species (i.e., *the music of nature*).
- To explore the musical sounds produced by humans and other species considered in this context (i.e., *the nature of music*).

AIMS

The purpose of this presentation is to present information regarding BioMusic and to raise issues that have implications for music perception and cognition.

MAIN CONTRBUTION

Animal Soundmaking

Before examining some of the larger issues in connection with music psychology, a few, brief examples of non-human vocalizations are presented to help set the stage.

- Male tree-hole frogs, living in the rainforest of Borneo, actively adjust the frequency of their calls over a wide frequency range to match varying resonating characteristics of water-filled logs (Lardner & Lakim, 2002). Further research has shown that females routinely select males that do the best job of emitting a resonant sound.
- Male humpback whales create extended vocalizations that are common to a pod (Gray, Krause, Atema, Payne, Krumhansl, & Baptista, 2001). Over a breeding season this song is varied so that by the next season it is completely changed (Payne, 2000). Whale vocalizations utilize many features that bear similarities to human music, such as improvisation, imitation, rhythm patterns, phrases, pitch intervals, formal structures, and even rhyming schemes.
- As with whales, songbirds, nearly half of the 9,000 species of birds, invest their songs with many of the same characteristics as human music (Gray et al., 2001; Whaling, 2000). Although males are the primary singers, a practice of antiphonal singing, called duetting, occurs between males and females (Slater, 2000). In duetting, a male and female bird alternate phrases in an exchange so tightly interwoven it can sound as if only one bird is singing.
- Ape vocalizations range from high-pitched squeals to pant-hoots to duetting, although singing, in general, is practiced perhaps by as little as 11% of primate species (Geissmann, 2000). Bonobos are subjects of intensive cognitive science research and successfully communicate with humans through sign language and lexigrams (http://www.gsu.edu/webprj01/cas/wwwjjp/public_html/depart/faculty/srumbaugh.htm). Recently a group of Bonobos began interacting with humans in musical ways, using instruments and exhibiting other abilities that may be considered ‘musical’ (P. Gray, personal communication).

BIOPHONY AND THE NICHE HYPOTHESIS

As these few examples illustrate, the sonic world in which humankind evolved is filled with an incredible array of detectable patterns. Modern living has detached us from natural soundscapes, but for our ancient ancestors, their very survival depended upon the ability to detect patterns in these sounds, derive meaning from them, and adjust their behavior accordingly. Wind and water noises, bird calls, monkey screeches, and tiger growls all had meaning. Beyond this, many (if not all) animal sounds were suffused with an “emotional” content (Hauser, 2000). They screamed in

pain, roared a challenge, or offered enticements for mating. Darwin contended that human musicality arose out of the emotional content of animal sound-making when he said that "musical tones and rhythm were used by our half-human ancestors, during the season of courtship, when animals of all kinds are excited not only by love, but by the strong passions of jealousy, rivalry, and triumph" (1897/nd, 880).

Early humans would have heard these sounds not in isolation but holistically as a sound tapestry. Krause's (2002) niche hypothesis likens biophonies to a symphonic score. A spectrogram of the sounds of the forest or around a pond shows that each species produces sounds that occupy particular frequency and temporal niches. These sounds are important—mating calls, for example—and they wouldn't be very effective if they were to become lost among all the other sounds. Thus, each animal has learned over the millennia to create sounds that occupy a very particular niche in the overall biophony, insuring that those for whom the sound is intended can identify and respond to it.

Growing up in a particular sonic environment—growing up both in the sense of the individual and of the generations over thousands of years—it is quite natural that humans would make attempts to mimic the sounds of nature. With our great brains we moved easily from mimicry to elaboration, extension, synthesis, and eventually the creation of novel sounds. Thus, we occupy our own niche in the natural order of sounds, but we are not content to remain in that niche. As a dramatic example, Krause (2002) finds that it now takes 2,000 hours of field recording to acquire one hour of usable material; the reason for this is that it is nearly impossible to find natural habitats that are not invaded by human sounds (what Krause calls anthrophony).

Much of the earliest music would have been vocal (and other bodily sounds), and many of the earliest instruments would have been biodegradable, having been made of reeds, wood, or skins, and thus lost in the mists of time. Nevertheless, there are evidences of early music. Scientific evidence has documented the use of flint blades for musical purposes perhaps 40,000 years ago (Cross, Zubrow, & Cowan, 2002). Acoustical analyses of caves show that those places where the acoustics are best are accompanied by many paintings; those places where the acoustics are poor have few or no cave paintings. "Thus, the best places to view the artwork of the cave appear to have been the best places to hear music or chants" (Allman, 1994, 216). Also found in the caves and elsewhere are whistles, flutes, and mammoth bones that may have been used as drums or as Ice Age xylophones (Hodges & Haack, 1996; Kunej & Turk, 2000).

IMPLICATIONS

The BioMusic Project has a number of implications for music psychology. Merely having scientists (a whale specialist, a bioacoustician, an ornithologist, a Paleolithic flute specialist, a larynx/syrinx specialist, and a neurologist) and musicians talking and working together is important. The BioMusic Team is working with the Science Museum of Minnesota, the Association of Science and Technology Centers, and the Cornell Laboratory of Ornithology to develop and mount a traveling museum exhibit on biomusic. In planning the exhibit, issues such as the following have arisen: What is music? Do only humans have music or do some animals have music, too? Why are we (humans) musical? What are the similarities and differences between human music and animal soundmaking? What are the influences of biophonies and

geophonies on human music? In some cultures, “it is astounding how closely their music reflects the complex rhythms, polyphonies, and sonic textures of the habitats where they live and hunt” (Krause, 1998, p. 76). Conversely, one might ask about the impact of anthrophony on biophony. How do human sounds impact natural soundscapes? Answers to all these questions and many others have profound implications for music psychologists who are trying to explicate the phenomenon of the human musical experience.

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