Available online at www.sciencedirect.com
SCIENCE DIRECT®
Cognition 100 (2006) 1–32
COGNITION
www.elsevier.com/locate/COGNIT

The nature of music from a biological perspective

Isabelle Peretz *

International Laboratory for Brain, Music and Sound Research (BRAMS), University of Montreal, Montreal, Que., Canada

Available online 17 January 2006

Abstract

Music, as language, is a universal human trait. Throughout human history and across all cultures, people have produced and enjoyed music. Despite its ubiquity, the musical capacity is rarely studied as a biological function. Music is typically viewed as a cultural invention. In this paper, the evidence bearing on the biological perspective of the musical capacity is reviewed. Related issues, such as domain-specificity, innateness, and brain localization, are addressed in an attempt to offer a unified conceptual basis for the study of music processing. This scheme should facilitate the study of the biological foundations of music by bringing together the fields of genetics, developmental and comparative research, neurosciences, and musicology.

Keywords: Musical capacity; Innateness; Specificity; Brain; Modules; Universals; Predispositions; Emotions

1. Introduction

Music is generally regarded as an exquisite art form, a refined product of human culture. Such a perspective has led many cognitive scientists to characterize music as the product of a general-purpose cognitive architecture (Bregman, 1990; Handel, 1989; Krumhansl, 1990) or as assembled from other faculties that were not originally designed for its purposes (Pinker, 1997). In a sense, contemporary composers and

* Fax: +1 514 343 5787.
E-mail address: Isabelle.Peretz@umontreal.ca.

0010-0277/$ - see front matter © 2005 Elsevier B.V. All rights reserved.
doi:10.1016/j.cognition.2005.11.004

ethnomusicologists reinforce this cultural perspective on music. Modern Composers argue that musical preferences are culture-specific and can be modified by exposure alone (Schönberg, 1984). Musicologists typically study music as a social construct that varies from culture to culture, rejecting cross-cultural quests for universals underlying the diversity (Blacking, 1990). Yet, common principles may underlie the world's diverse musical cultures. These principles may also be guided by innate mechanisms. In other words, music might be in our nature. The consideration of music as a biological function rather than a cultural invention is relatively recent (Wallin, Merker, & Brown, 2000) and hence, is far from established. The objective of this special issue is to consider the different perspectives and sources of evidence regarding the biological[1] foundations of music.

Humans are, by definition, biological organisms. As a consequence, anything that the human brain creates might be considered biological. However, the human brain is also a highly flexible system that can learn and invent codes and skills that can be transmitted to others by nongenetic mechanisms. The Morse code is such an invention. The question here is whether music is such a cultural product or is in "our genes".

Obviously, music is not a recent product. Unlike the Morse code, music was not invented at one time and one location and then spread to others. Throughout human history and across all cultures, individuals have produced and enjoyed music (Merriam, 1964). Music has emerged spontaneously and in parallel in all known human societies. Although we do not know when music emerged because there are no fossil records of singing, archeological evidence shows a continuous record of musical instruments, dating back to at least 30,000 years (D'Errico et al., 2003). Thus, music is an ancient capacity rather than the recent creation of a single intelligence. Music appears to transcend time, place, and culture.

Paradoxically, the musical capacity appears to be fully developed in only a minority of humans who can make music. Becoming a proficient musician requires thousands of hours of practice and, in most case, explicit transmission. This is often taken as an argument against the notion that the musical capacity is innately determined. If genes were responsible for the human musical capacity, then everyone should be able to engage in musical activities. In fact, everyone does. Nearly everyone can carry a tune (Dalla Bella, Giguère, & Peretz, submitted) and move to music. The problem arises from the association of music-making with an elite of professional musicians. What is usually forgotten is that music is meant for the ears of the majority. Everyone from all walks of life and all cultures is musical to some extent. Unless they are tone-deaf, all humans exhibit a precocious inclination for music. In short, music appears as natural as language is.

Music is more mysterious than language because its *raison d'être* remains unsettled. Music has no obvious utility. Music is also difficult to define. Everyone knows what music is but cannot delimit its boundaries. The concept of music is variable, and some cultures have no separate term for music, including dance and music in

[1] The biological-cultural distinction refers to the nature-nurture, innate-acquired distinctions. I selected the term "cultural" because for most people, music is part of culture like other forms of arts, and has little to do with biology.