

Steven Mithen, *The Singing Neanderthals: The Origins of Music, Language, Mind, and Body* London: Weidenfeld and Nicolson, 2005 (hardcover), 2006 (paperback). ISBN13: 9780297643173 (hardcover) £20.00. ISBN13: 9-780753820513 (paperback) £9.99.

Sundry speculative accounts have been written by both amateurs and discipline-specific experts on the origins of music and language. However, in the last thirty years and with advances in science, technology, and in human “intellectual” creativity in general, researchers have sought to broaden the scope and sites of evidence that would better explain the supposedly “common” origins of music and language. Two of these additional sites—mind and body—are indicated and elaborated, in varying degrees, in Steven Mithen’s *The Singing Neanderthals: The Origins of Music, Language, Mind, and Body* (2006). It is important to note in this opening that *Singing Neanderthals* is a welcome relief from the many haphazard, undocumented and “pre-scientific” suppositions and casual statements of recent years and which address, for example, the influences of music on fetuses, the contributions of music to the acquisition and refinement of skills in mathematics, etc. Debates also continue on existence—and thus traits—of neural, cultural, and biophysical constitutions of the “modules” “hemispheres” of the human brain. In addition, the term “evolution,” which recurs almost *ad nauseam* throughout *Singing Neanderthals*, evokes a certain nervousness and suspicion—the reasons are many and here are two: First, attempts and some progress have been made in pruning down some of the ethnocentric and paltry scholarship associated with earlier studies (especially in *Vergleichende Wissenschaft* of the eighteenth, nineteenth, and early twentieth centuries) which focused on origins, evolution, and diffusion of human life, material culture, geophysical phenomena, musical practices, languages, aquatic and botanical lives. However, today’s scholars (especially those of postcolonial backgrounds and whose cultures were denigrated in those early accounts) and advanced students continue to demonstrate, in various guises and overt ways, the subtle persistence and perpetuation of the vestiges of *Vergleichende Wissenschaft*. And second, the contemporary and yet lively claims and counter-claims on Evolution and Creationism “sciences” (especially in regard to American public school systems) are significant developments that reinvigorate, albeit indirectly, vestigial conceptions of “evolution,” “primitive” and “tribe.” This is not to discredit totally contemporary scholarship which often would, in attempt to be politically correct, adopt “ethnic” in place of “tribe,” for example.

It is very clear that Mithen transcends many of these vestiges, both pragmatically and meticulously through his reliance on recent evidences, even when these are better supported in specific disciplines such as psychology and prehistory. However, since the book locates and thus confirms the origins of man on the African continent, Mithen often is predisposed to naming “Africa” and “African apes.” It is clear Africa was a major victim in the early studies and thus no matter how careful we are in our more elegant scholarship, the frequent mention and linking of Africa where the subject of evolution is discoursed would naturally raise some eyebrows. A clear statement of both sensitivity and an awareness of the possibilities of readings of “Africa” and “apes” in this new scholarship would, therefore, have been very appropriate and commendable. (This is not to dispute Mithen’s locating of human origins in Africa; even as late as July 11, 2007 the media, worldwide, reports of a new fossil find in Ethiopia, i.e., Africa, the most recent fossil evidence of human origins of almost 5 million years.)

What is in this book, what are the major arguments and evidences, what are the author’s qualifications and what are the main or new contributions? I do not pretend to answer these questions in detail but will offer a generous sampling of my impressions but which are anchored in the supportive literature.

There are seventeen chapters, organized in two parts: “Part One: The Present;” and “Part Two: the Past,” which carries the moniker subsection, “Singing Neanderthals.” The specific chapter headings, which indicate the scope of the book, include the following selections:

1. The Mystery of Music: The Need for an Evolutionary History of Music
2. More than Cheesecake? The Similarities and Differences Between Music and Language;
4. Language Without Music: Acquired and Congenital Amusia;
5. The Modularity of Music and Language: Music Processing Within the Brain;
6. Talking and Singing to Baby: Brain Maturation, Language Learning and Perfect Pitch;
7. Music, Emotion, Medicine and Intelligence;
9. The Origin of ‘Hmmm’ Communication;
10. Getting into Rhythm: The Evolution of Bipedalism and Dance;
12. Singing for Sex: Is Music a Product of

Sexual Selection? 15. Neanderthals in Love: ‘HmMMMM’ Communication by Homo Neanderthalensis; 16. The origin of Language: The Origin of Homo Sapiens and the Segmentation of ‘HmMMMM’; and 17. A Mystery Explained, but not Diminished: Modern Human Dispersal, Communicating with the Gods, and the Remnants of ‘HmMMMM’.

The author’s expertise is in “prehistory;” he explicitly acknowledges in the preface his lack of formal training in music, which would have important implications for his limited musicological sources and their treatment (especially those from “Comparative Musicology,” i.e., the pioneering years of what is now known as ethnomusicology). Unfortunately, there is no consistency in which his field of expertise is identified in some sources: for example, he is referred to as “cognitive archaeologist” (<http://soundandmind.amsteg.org/?cat=4>), or as “professor of early prehistory” (http://books.guardian.co.uk/reviews/scienceandnature/0,,1519096.00.html#article_continue. Accessed July 23, 2007).

A book of this grand interdisciplinary scope and about a music-centered subject cannot afford to overlook the ideas, methods, and tools of comparative musicologists such as Carl Stumpf, Erich Hornbostel, Curt Sachs, Marius Schneider, Alexander Ellis, Edith Gerson-Kiwi. There are important reasons why a familiarity with these pioneers in “origins” would significantly embolden and thus raise the explanatory power of this brave, inter- and multidisciplinary project. For example, Carl Stumpf, the first musicologist to publish a full volume work on musical origins, *Die Anfänge der Musik (The Origins of Music, 1911)* was fully involved in pioneering studies in phenomenology and psychology, two important components of *Singing Neanderthals*. Phenomenology is, however, the least investigated in Mithen, and a background in this field and in the works of comparative musicologists would have thus allowed him to approach and attain the levels of sophistication and breadth implicated in this multifaceted project. A casual remark such as the following actually suggests an element of frivolity which would undercut the author’s expertise on which the work partially rests: “Writing this book has been an attempt to compensate for my musical limitations.” (P. vii.) The overall quality and scope of the *Singing Neanderthals* can be summarized along major strengths and weaknesses.

Major weaknesses include extensive reliance on secondary sources; lack of expertise in the related disciplines, especially psychology and music; reliance on psychology and music sources that privilege Western tonal music parameters (there is very little consideration of non-classic music of the West and non-Western musical traditions); frequent, indirect disclaimers: hypothetical, speculative, inconclusive words/phrases such as “may be,” “might,” “perhaps,” and “would have been”; lack of familiarity with recent developments in cognitive ethnomusicology; lack of detailed attention to specific cultural processes, contextual factors and general ethnographic details from varying times and places; lack of primary sources—e.g., insufficient examples from personal investigations, field observations; unclear determinations and uncritical assumptions about the nature of music-language continua; inadequate perspectives on defining “musicality” in relation to the general musical object, including appropriate investigative tools; and theories of music perception under-explored and not clearly identified in relation to music cognition.

The book has strengths, as well: extensive supportive secondary literature; balanced critique and originality in reviewing and resolving differing perspectives, paradigms, and methods (such as the Fodor’s modularity and some psychological experiments); persuasive arguments and important updates on debates about time, place, conditions and patterns of human evolution; and the identification of basic linkages among important cultural, biological, physical, psychological, communicative and musical traits (e.g., as summed up in the subtitle, “Music, Language, Mind and Body” although these traits are often limited to Music and Language).

I take initial issue with this lack of background in comparative musicology as stated above, especially in its broader scope embracing psychology and phenomenology. For example, Carl Stumpf receives a full complement of coverage along with Edmund Husserl, the phenomenology pioneer, in Herbert Spiegelberg’s *The Phenomenological Movement: A Historical Introduction*. 2nd ed. Vol. 1, 1976). Further, both Stumpf and Hornbostel were part of the Gestalt psychology movement, an important research field in which the “mind” (cf. Mithen’s subtitle, “.....Mind, and Body”) was the main object of inquiry. Similarly, numerous subsequent publications by Curt Sachs (e.g., *The Rise of Music in the Ancient World, East and West*, 1930; *The Wellsprings of Music*, ed. Jaap Kunst, 1961; and *World History of the Dance*, 1937), notwithstanding the lack of direct field contacts or observations and their general ethnocentric

framework, these seminal works showed concern for broader sites of evidence, including gesture, even if this is limited to bodily movement and rhythmic motion. Any serious debates, for example, on whether language or music came first must necessarily include at least the idea of “logogenesis” (i.e., “word-born melody”), as expounded in Sachs and Hornbostel. In this way, Mithen’s conclusions and speculations on pitch, tempo, language and music and their origins in a “single system” and their later “independence” would thus resonate with much appeal.

Mithen would clarify his own hypothesis of origins at the beginning of the book but only after reviewing Steven Pinker (2003) who proposes that language came first and music second:

The remaining possibility is that there was a single precursor for both music and language: a communicative system that had the characteristics that are now shared by music and language, but that split into two systems at some date in our evolutionary history. (Mithen 2005, p.26)

Yes, these comparativists with significant inter- and multidisciplinary leanings were not privileged with the new and updated tools and ideas we have today, but a detailed explication of their basic assumptions, hypotheses, and methods of inquiry is necessary in establishing the originality of our “revolutionary” ideas and instruments and in preparing for their positive reception, both in the world scientific community and in the public space.

The holistic ‘HmMMM’ utterances of *Homo ergaster* would have been as much music-like as language-like. We should envisage each holistic utterance as being made from one, or more likely a string, of the vocal gestures that I described in the previous chapter. These would have been expressed in conjunction with hand or arm gestures and perhaps, body language as a whole, as I will describe below. In addition, particular levels of pitch, tempo, melody, loudness, repetition and rhythm would have been used to create particular emotional effects for each of these ‘HmMMM’ utterances.... The key argument of this chapter is that both the multi-modal and the musical aspects of such utterances would have been greatly enhanced by the evolution of bipedalism. (Mithen 2005, pp. 149-150)

As shown in the quotation above and drawing mainly on experiments and conclusions from psychology, speech and hearing, and evolution studies, Mithen works arduously to sustain his initial suggestions of close interrelationships and thus further suggests common origins of music, language, gesture, etc. The arguments and their supportive evidences would have been much persuasive had the author first devoted attention to a critical examination of the extant literature in basic musicological (including music cognition, cognitive ethnomusicology, and related fields) studies. For example, the author misses important details by limiting his references to older foundational work by John Blacking (1973) in the discussions of the linkages among music, body movement, and emotion (p. 153). The discussion would have been improved with an examination of other Blacking sources (e.g., 1977, 1984, 1988) and coverage of Kippen (1987).

The very brief mentioning of “musical instruments...as an extension of the human body” raises several questions and doubts, mainly because the statement has no larger reference in the literature (or in specific personal research contexts) to qualify it as a useful one:

Here we must note the importance of song – the combination of music and language. Song can be considered as the recombination of the two products of ‘HmMMM’ into a single communication system once again. But the two products, music and language, are only being recombined after a period of independent evolution into their fully evolved forms.... Moreover, that music is often produced by instruments which, as an extension of the human body in material form, are themselves a product of cognitive fluidity. And that is a further consequence of the segmentation of ‘HmMMM.’ (Pp. 273-274)

Instead, I must again refer readers to a few of the pertinent sources, not to mention Blacking, et al. above. Three sources, which also address cognitive dimensions of the musical instrument and body

connections are Baily (1992), Davidson (1994), and Ray Birdwhistell's classic text, *Kinesics in Context: Essays on Body Motion* (1970). The notion of and approach to "communication system" does little to advance the arguments about music-language-mind-body relations since it was not sufficiently explored beyond its rudimentary conceptions. In this case, one would have to turn to, for example, Harwood (1976) again, who demonstrates the active, interactive, and "constructive" nature of communications through the adoption of an "information-processing" perspective.

What is this "Hm" about? Mithen's idea is that music and language have origins in a form of "holistic" communication among early hominids and which he describes as "Manipulative," "Multi-modal," "Musical," and "Memetic." (**H**olistic, **m**anipulative, **m**ulti-modal, **m**usical, and **m**emetic. See also exegeses in quotes above.)

Further, the fuzzy distinctions between music and language acknowledged by Mithen should, in essence, become useful resource rather than a deficit, which exposes his limited grasp of the existential and hence more encompassive definitions of music in world cultures:

Some cultures have forms of vocal expression that it neither our category of music nor that of language. The most evident are the mantras recited within Indian religions. (P. 12)

In fact, a clear and broader understanding of the complex relationships between music and language is stunted, first by our insistence on *a priori* categories, limited range of examples, and lack of sensitivity to everyday articulations beyond the Indian example. For example, in what world epic (another example of problems with naming—categories) traditions, it is this fuzzy status that is explored for various artistic, aesthetic, and ritualistic purposes. Even the Indian example alluded to is exemplified in numerous world contexts where artificial and practical means are constructed to ensure the "proper" performance and ritual efficacy. Such strategic but contextual validation of chant, epic, recitation, sing-song, declamatory speech, incantation, etc. serve as working categories that conjoin and at the same transcend music and language dichotomies; they also serve as performance constructions of local genre categories designating ensemble (or song) type and function.

Essays by George List (1963), Anthony Seeger (1979), and Carol Robertson–De Carbo (1976) are basic examples that would appeal to any serious researcher interested in the dialectics of music and language. Another expressive form that complicates the music-language dichotomies is the lament. Since this peculiar human expression is closely related to issues and generation of emotion (which occupies a central portion of the Mithen's discussions as far as the origins and emotional attributes of music and language are concerned, including those identified with "apes"), a more critical and expansive treatment of the subject of music and language/speech boundaries is thus required, an indispensable task in establishing a firm foundation for *Singing Neanderthals*'s primary frames of reference and assumptions.

Without a clear understanding of the *what, why, and how* of the deeper and yet bewildering song-speech continuum, the whole project rests on shaky ground, no matter how many psychological tests, language and musical experiments are cited. Even in the case of lament, which is included in Alan Lomax's stalled cantometrics/parlametrics/choreometrics (Lomax 1968) project's examples of world "music" traditions, there are significant parameters and contextual employments of the lament which would illuminate the nature of music-language interconnections, for example as explored in Margarita Mazo essay, "Lament Made Visible: A Study of Paramusical Elements in Russian Lament" (1994). Mazo highlights the timbral characteristics as well as resources and techniques of embodiment (body is very important here, too) that identify the lament in various contexts of performance. I hazard to say also that whether we are dealing with lament, chant, or song but in relation to the mind and body, there are very important questions that will always remain unanswered. For example, a lament performed/sung in ritualized context such as wedding, or re-enactment of it in a contemporary stage will present specific challenges that our modern tools cannot access or describe. For example, how is it possible to study the performer in a real and yet dynamic funerary context? What are some differences and challenges in a staged lament and the one occurring in a funerary context? While it may be possible to "control" the performer in a staged version (assuming such "control" mechanism and its tools will constitute part of the dramaturgy, the entertainment aspect of the performance); I leave the problems in the example of an ongoing funerary situation to the readers' imagination. At what level of precision are we able to determine "faked" and "natural" emotions and which sites (language, music visual cues/display, historical memory, individual biophysiology, etc.) are responsible? Finally, the investigator must be clear about not only the limits but also fascinating possibilities that await us when we formulate operational definitions of the

“mind” and the brain; the main challenge is in trying to discover their individual statuses as well as their mutual engagements in the context of musical, verbal, and motional operations. For example, to what extent is the mind independent of the brain, and what is the mind’s constitution and manifestations in relation to the “soul,” if such incorporeals are, indeed, easily accessible?

Maybe with a hidden camera that is able to scan with precision the brain wave, inner workings, locations and interactions of musical, speech and paramusical communications and processings, we can arrive at some temporary indicators of the boundaries of speech and music, including the of qualities of lament. (I must confess here that proper research protocol will not encourage the idea of a “hidden” camera.) In sum, lament seems a very propitious area where the intersections and feedback processes (and the whole idea of origins and evolution) involving the mind, brain body/gesticulation/gesture, music and language can be examined in very meaningful ways, if the right tools become available.

It is worth noting that later and with that brief discussion of chant/mantra Mithen prematurely suggests an earlier stage in human evolution (i.e., for chant):

Finally, we should recall that form of vocal expression I referred to in chapter 2, that can be defined neither as music nor as language, while it exhibits aspects of both: Indian mantras.As relatively fixed expressions passed from generation to generation, they are, perhaps, even closer than IDS [infant-directed speech] to the type of ‘HMMMM’ utterances of our human ancestors. (P. 277)

This suggestion, when seen in the larger discussion in chapter 12, especially the subsection titled, “From birdsong to human music” (pp. 178ff.) and in the light of the following conclusion will carry much weight and positive impressions but only if, for example, the case for the lament (and related performance acts) elaborated above is given fuller attention:

We have already seen that Miller’s last assertion is quite wrong: the musicality of our ancestors and relatives did have considerable survival values as a means of communicating emotions, intentions and information. (P. 178ff., reviewing the works of Darwin and Geoffery Miller (1997; 2000).

There is no doubt that Mithen’s ideas are firmly anchored in evolutionary premises and such unwavering commitment—especially in the light of several areas that either lack discussion altogether or are wanting in sufficient evidence—mutes the impact of some of the more exciting examples presented. For example, the following excerpts, which should not be seen as redundant or space-wasting, support my conclusion:

We should first note that the anatomical differences between the early hominids, especially *Homo*, and the modern-day apes would have provided the potential for a more diverse range of vocal sounds. The key difference is the reduction in the size of the teeth and jaws because of the dietary trend towards meat-eating. This would have changed the shape and volume of the final section of the vocal tract...

The changes to the teeth and jaws, and hence the potential movement of the tongue and lips, are important because we can think of sounds emitted from the mouth as deriving from ‘gestures’, which created by a particular position of the so-called articulatory machinery—the muscles of the tongue, lips, jaws and velum (soft palate)...

As motor actions, such gestures ultimately derive from ancient mammalian capacities for sucking, licking, swallowing and chewing. These began the neuroanatomical differentiation of the tongue that has enabled the tongue tip, tongue body and tongue root to be used independently from each other in order to create particular gestures, which in turn create particular sounds, some of which involve a combination of gestures.

As the size of the dentition and jaws in the early *Homo* species became reduced, a different range and a greater diversity of oral gestures would have become possible

compared with those available to their australopithecine ancestors, Although we do not know exactly how the potential range of vocalizations would have varied between the australopithecines, early *Homo* and the modern African apes, one thing is certain: hominids would have been more sensitive to high-frequency sounds than are modern humans. (Pp. 128-129)

Finally, the firm commitment to evolution is defended further with gusto (but hidden in a footnote) and in the light of two different orientations from “forthcoming” literature (I have supplied full bibliographic information where the source is now in public domain):

Some scholars such as Bickerton (1990), Arbib (in press) [available: Michael Arbib, “From monkey-like action recognition to human language: An evolutionary framework for neurolinguistics.” *Behavioral and Brain Sciences*, 28/2(2005):105-124] and Tallerman (in press) [Tallerman, M. (2005). *Language Origins: Perspectives on Evolution*. Oxford: Oxford University Press, 2005.] argue against any direct evolutionary continuity between human language and ape vocalizations, claiming, for instance, that all ape vocalizations are involuntary and rely on quite different parts of the primate brain from those used in human language, While there are undeniable and significant differences, to argue that these invalidate evolutionary continuity strikes me as bizarre. Seyfarth (in press) [Dorothy L. Cheney and Robert M. Seyfarth, *Baboon Metaphysics: The Evolution of a Social Mind*. Chicago: University of Chicago Press, 2007] has succinctly summarized the case for continuity citing studies that demonstrate continuity between the behaviour, perception, cognition and neurophysiology of human speech and primate vocal communication. (P. 304, Note no. 3.)

In the interest of fairness, it is important for me to put in context at least one of the sources, especially the “pro” for Mithen; conclusions from this work update Darwin in very precise and provocative ways but which ignore new or emerging culturally and contextually sensitive paradigms. Here is an excerpt from a summary of Cheney and Seyfarth:

Some of the most striking evidence for an innate predisposition to learn one’s own species’ communication comes from children who are born blind or deaf. Although they cannot see the objects in the world to which spoken words refer, blind children develop language at roughly the same age and in the same manner as children who can see. Data from children born deaf are even more striking... Although raised in loving, supportive environments, these children were deprived of any exposure to language. Nonetheless, they spontaneously invented a sign language of their own, beginning with single signs at roughly the same age that single words would ordinarily have appeared. And during the following months and years, as they developed more complex sentences, the children produced signs in a serial order according to their semantic role as subject, verb, and object.

The songs of sparrows, the calls of monkeys, and the language of human children could hardly be more different, yet they all lead to the same conclusion: Each species has a mind of its own that, like its limbs, heart, and other body parts, has evolved innate predispositions that cause it to organize incoming sensations in particular ways. The mind arrives in the world with constraints and biases, “prepared” by evolution to view the world, organize experiences, and generate behavior in its own particular way. And because each species is different, the behavior of different species is unlikely to be explained by a few general laws based entirely on experience... This conclusion from the laboratory is important, because it encourages us to believe that Darwin was right: we can trace the causation of thought in different species, study its structure, and reconstruct its evolution. [<http://www.press.uchicago.edu/Misc/Chicago/102436.html>]

Mithen acknowledges the complex interdisciplinary nature of his research by briefly mentioning an important, developing research that takes into account the brain, the body, the mind, music, language—that is, entrainment. As is common throughout the text, this where, unfortunately, we encounter the usual “may be” refrain:

It may, indeed, be in this connection that the phenomenon of entrainment – the automatic movement of body to music – arose. Experimental work with chimpanzees seems essential since, according to this hypothesis, their lack of full bipedalism should mean that they also lack the phenomenon of entrainment to music. (p. 153).

The title of chapter ten, “Getting into Rhythm” is an express reference to entrainment but which is not developed or explored in depth by the author. It is important, especially for the subject of music-language-body relationships, to broaden and update expert sources with those from emerging fields of study and new technologies such as in entrainment where serious collaborative research is being pursued. Cognitive ethnomusicology is one such field which integrates neurobiology, MRI, psychology, music cognition, and various cultural factors. For example, the October 24, 2007 Pre-Conference Symposium on Cognitive Ethnomusicology of the Society of Ethnomusicology focuses on “New Directions” such as “Music and the ‘Cultural Brain’” and “Music, Movements, and Entrainment.” In his latest work, Udo Will, a leading figure in cognitive ethnomusicology, is able to offer a much broader, incisive perspectives and persuasive arguments and evidences, including his open support for contextual and cultural factors, as seen in the following excerpts from his recent essay, “In the Garden of Cultural Identities: On the Logic of Culture, Race and Identity in Postmodernist Discourse”:

In Turner’s essay nature and culture do indeed meet, but they are still separate domains. At the time Turner took an interest in brain sciences, research in this field was largely dominated by a ‘cognitivist’-computational orientation (the human brain works like a computer). This direction has been and still is criticized for neglecting or omitting the affective-emotional and the bodily existence of humans as well as eliminating contextual elements – a direction not well equipped to overcome the nature/culture dichotomy. However, during the last few decades cognitive sciences saw the emergence of new and powerful paradigms - connectionism, autopoiesis, enaction/embodiment – as well as new orientations like neuro-phenomenology, that offer promising alternatives to the standard cognitivist approach.... In both these approaches, the anthropological as well as the neuro-phenomenological one, there is an essential link between the cultural and the biological domain, each cannot be understood without the other, and there can no longer be a question of either relocating one domain in the other or defining one in isolation from the other. The cultural domain is no longer conceived in opposition to the biological and its grounding in action seems to preempt its reification.

What is needed is an anthropological reconceptualization of ‘culture’ along those lines proposed by Tomasello and Becker, one that takes into consideration the basic aporias of the old one and integrates insights and perspectives forwarded by neuroscientists like Varela and Freeman. (Will, in press.)

As briefly indicated in the beginning, phenomenology remains one of the important fields that has been under-explored and two main reasons are: there is an enormous complexity involved in phenomenological research in terms of methodology and relevant tools; and the level of erudition and sophistication demanded of the researcher, not counting interdisciplinary challenges inherent in any such research enterprise. It is, therefore, both interesting and at the same time very superficial to see how Mithen intimates and thus implicates “phenomenology” without any sufficient explication, as shown in the context cited above.

It is totally unacceptable to label chapter fourteen “Making music together: The significance of cooperation and social bonding” and provide a large body of discussion around this theme without acknowledging the prime influential source, Alfred Schutz’s classic essay “Makin Music Together” (Schutz

1962). Even Will could not advance his more avant-garde techniques and perspectives without situating the phenomenological imperative:

In both these approaches [phenomenology and scientific materialism], the anthropological as well as the neuro-phenomenological one, there is an essential link between the cultural and the biological domain, each cannot be understood without the other, and there can no longer be a question of either relocating one domain in the other or defining one in isolation from the other. The cultural domain is no longer conceived in opposition to the biological and its grounding in action seems to preempt its reification.... The orientations developed by neuroscientists like Varela, Freeman, or Nunez clearly point toward a phenomenology of embodiment that is of outmost relevance to the social sciences and humanities. (Will, in press)

There are, however, some important common sense observations and examples drawn from psychological tests with prisoners in William McNeill (1995) on “cooperative behavior” and “boundary-loss” (blurring of self-awareness and the heightening of fellow feeling with all who share in a dance” (p. 209) and which work Mithen summarizes as “communal music-making is actively creating, rather than merely reflecting, that pleasing sense of unity.” (P. 208) The common supposition underlying this chapter is found in Mithen’s own words: “That joint music-making forges social bonds and group identity is the ‘common-sense’ understanding with which I began this chapter.” (P. 217)

Although he does not go into all the necessary details, the author makes effort to link group music making to its social, neurological, emotion, and general cognitive apparatuses. The example from William Benzon (2001) who the author describes as “jazz musician” and cognitive scientist discusses further the idea (and some processes) of synchronization (or “coupling”) in relation to emotional and nervous states is probably the ideal space where the author could situate in useful perspective the extensive work by Paul Berliner, *Thinking in Jazz: The Fine Art of Improvisation* (1994). There are other important insights and benefits that might accrue from relating to this work, for example, the basic participant-observation method, focus interviews, multiple field contexts, performers’ semantic differentials, etc., all provide important materials that would guide an arm-chair researcher about the relevance of field and general ethnographic details in researching the cognitive dimensions of music, language, and gesture from phenomenological perspectives.

A mere mention of “contextual” and “cultural” factors will not provide sufficient evidence or support and cultural and individual contexts are just as crucial as any biophysiological and cognitive processes. Thus, Mithen’s case for “culture” is even more repressed, as seen in the following position on biology-nature-culture (my reformulation):

Indeed, some would argue that the type of environment within which the brain develops is the principal determinant of its neural circuitry. Babies are born into and develop within cultures that have language as the dominant form of aural communication, and this influences the neural networks that are formed within their brains. Nevertheless, the genes we inherit from our parents derive from our evolutionary history and must channel that development; it is the extent of this channelling that remains highly debated among psychologists. My own view is one gives equal weight to evolution and culture as regards the manner in which neural networks develop. All I expect is a broad compatibility between evolutionary history and brain structure – and this is indeed what appears to be present. (Pp. 274-275)

Again, Will’s essay seems to make a clearer and stronger statement on the nature of the biology-culture-nature debate and advances made up to the present. An attempt to secure some of the arguments in “cultural” contexts remain open-ended, at best, as seen in the incomplete argument about maternal care, lullaby traditions and a problematic identification of the “expression ‘Yuk’” and its associated gestures as “found in all cultures,” “inbuilt” and that “parents in all cultures are frequently saying ‘Yuk’ to their babies while making the appropriate facial expression...” (p. 203) Or when he says,

“[d]emand-feeding – feeding whenever the baby cries for food – is pervasive in all traditional societies and requires close contact between mother and infant all day and night; its approved absence in modern Western society is quite peculiar.” (P. 201)

A serious reader is very likely to catch up with many of these flawed areas, especially those that are patched up to “explain” environmental, cultural and individual variations or impacts. A case for gesture, gesturing, and general synaesthesia and kinesthetics would consider also, in our times, the impact of repeated tasks and new posture-mobilities that have been facilitated by human adaptive mechanisms and creativity in response to new challenges from digital and cyberspace technologies. How are our brains and neuro-acoustic sensibilities evolving as we adapt physically, neuro-psychologically, and mentally to several forms of earphones, headphones, surround sounds, television watching, nonlinear-browsing/reading, riding (as opposed to walking) to work, text-messaging in the dark, and so on?

Of course, in the midst of many conflicting ideas in past and present researches, it is almost a pyrrhic victory for Mithen to quickly take middle grounds in many of such unresolved research issues; his slouching toward and away from Jerry Fodor, *La Mente Modulare* (1988), one of the controversial scholars in cognitive studies, is an example:

In general, an evolutionary approach to the mind leads to an expectation that the mind will have a modular structure. In accordance with the specific evolutionary history I have proposed, we should expect pitch and temporal organization to have the degree of independence that Peretz suggests, because the latter appears to have evolved at a later date, being associated with the neurological and physiological changes that surrounded bipedalism. Similarly, we should not be surprised that Peretz found that the root of congenital amusia lies in the ability to detect variations in pitch, because from an evolutionary perspective that appears to be the most ancient element of the music system within the brain.

The fact that the music and language systems in the brain share some modules is also to be expected given the evolutionary history I have proposed, because we now know that **both originate from a single system** (my emphasis). Conversely, the fact that **they also have their own independent modules** (my emphasis) is a reflection of up to two hundred thousand years of independent evolution. The modules relating to pitch organization would once have been central to “HmMMM” but are now recruited only for music (**with possible exception in those who speak tonal languages**) (my emphasis); while other “HmMMM” modules might now be recruited for the language system alone—perhaps for example, those relating to grammar. This evolutionary history explains why brain injuries can affect either music alone (chapter 4), language alone (chapter 3), or both systems if some of the shared modules are damaged. (P. 274)

Critical readers must turn to Laura Bennet (1990), Richard Samuels (1998) and Okasha (2003), for example, in order to locate firm anchoring of convictions and arguments that contest and caution Fodor.

First, the following recent conclusion from an unpublished “preliminary results” of an ongoing study of speech/prosodic and musical rhythms in tonal language systems provides a very reliable basis and context for the yet-to-be-examined, parenthetical (yet significant) remark about “tonal languages” (see bold face above):

Such a close correspondence of prosodic components in music and speech does not exist in all tonal languages.... Though in actual performance sung and spoken versions may differ in the time and/or frequency domain, the tight link between them seems to be established through the interaction of verbal recall, recall of toneme patterns, phonetic articulatory constraints and syllable duration patterns. (Udo Will, unpublished preliminary research conclusions involving Ewe and Chinese examples)

Mithen's secondary sources and conclusions on neural processing of melodic contour and speech prosody are also very important, especially with the focus on the brain and in light of Will's findings. According to Mithen,

...a study published in 1998 by Isabelle Peretz and her colleagues [Besson et al. 1998] is particularly important because it explicitly attempts to identify whether the same neural network within the brain processes sentence prosody and melodic contour, or whether independent systems are used. (P. 56) The results were very striking indeed. CN performed as well as the control subjects at identifying whether paired sentences and paired melodies were the same or different, for each of the three classes of sentence (statement-question, focus-shift and timing-shift)... As CN was able to process both speech prosody and pitch contour, while IR was able to process neither, Peretz and her colleagues conclude that there is indeed a stage at which the processing of language and of melody utilize a single, shared neural network. From IR's speech deficits, they concluded that this network is used for holding pitch and temporal patterns in short-term memory. (P. 58) [Subjects CN and IR: "Both suffered from amusia and had brain damage in left and right hemispheres...But IR was entirely unable to sing even an isolated single pitch." (P. 56)]

I believe the experiments and results cited (including additional ones in which different subjects with varying music and language conditions were involved were also reported and discussed) increase the number of questions that Jerry Fodor continues to encounter. The more rigid modular approaches (massive modularity) of Fodor and the more artificial, neural-network and transformational grammar approaches of Chomsky, et al. (including the oft-cited Fred Lerdhal and Ray Jackendoff, *Generative Theory of Tonal Music*, 1983) have since been tempered by varying emphases on information-processing paradigms (for example as preferred over "information theory" in Dane Harwood's 1976 essay, "Universals in Music: A Perspective from Cognitive Psychology."). Even when both Mithen and Harwood acknowledge input from culture and environment, these do not receive any significant analysis or argumentation. For example, Harwood defines and prefers "information-processing" along and within parameters of "perceiving, remembering, understanding and using musical information in culture" (Harwood 1976); the "mind" is also carefully positioned together with "language," thus:

[A]ll people 'construct' their worlds; we impose categories on our perceived environment, and this "categorical perception" is as indicative of musical behavior as of vision, language—indeed, all human thinking. (Harwood 1976)

Harwood's constructivist's perspectives are, however, a significant advance in appreciating and integrating individual contextual factors in cognitively oriented research. The clearest statements on the music-language-brain debates are found in Mithen's' review of Isabelle Peretz's studies (referenced above), for example:

Her final point, about the apparent overlap between the neural networks used for speech and music tasks, is one of the most important, but still unresolved, issues....[Aniruddh] Patel has noted a curious result emerging from these studies: although the lesion studies have shown that music and language capacities can be partially or entirely dissociated, the brain-imaging studies suggest that they do share the same neural networks. This apparent contradiction remains to be resolved. (P. 65)

New and ongoing research work in the cognitive ethnomusicology laboratory at the School of Music, The Ohio State University is opening new avenues in regard to our understanding of the human brain and in relation to the processing of speech and music within various individual and cultural contexts. In addition, the laboratory employs advanced technological resources and novel techniques, including MRI and EEG and in collaboration with experts in the fields of medicine and psychology. It is also within this innovative research setting that the "tonal languages" alluded to by Mithen (see bold text in quote above)

are being examined in relation to communication of verbal and musical messages, drawing on research with both Chinese and Hmong languages.

It is critical that we recognize the intersection and hence the problematics of meaning, cognition, perception, communication strategies, and notions of ineffability, for example. It is at this point of this review that the Diana Raffman's *Language, Music and Mind* (1993) important work must be acknowledged, for it provides succinct, clear and authoritative positions on the various issues and subjects covered in Mithen. (Unfortunately Raffman is among the list of very significant works missing in the final bibliography.) For example, Raffman critiques and resolves issues of differences between music and language; emotion and musical meaning, Fodor's modularity, ineffability, etc., exposing the major flaws in those works that are premised on extensive similarities, fixed or machine- structures/operations, and on so-called universal prototypes. Of course, Raffman's samples, just like most other researchers on the subject, are limited to Western tonal music.

Meaning, affect, emotion and how these are qualified in various musical contexts in relation to the mind, brain and body are presented but the discussion is limited to the older perspectives, including the very controversial and outmoded ideas of Deryck Cooke (1959). (See, for example, John Shepherd's vigorous and critical review of Cooke in *Whose Music? A sociology of musical languages*, 1977). Sections of *Singing Neanderthals* on emotions are important but half-baked, especially when they are proffered to support the premises and speculations about evolution. Thus, no further argumentation or critique is provided beyond the summative dictum: music influences our emotions. A main question, however, remains unanswered: Which musical types or structures evoke which emotions and why?

CONCLUSIONS

Singing Neanderthals is a recent addition to the literature on music-mind-language-body discourse and has revitalized debates and interests in issues of origins, idiosyncracies and interactions of music, language, mind, and the body. The wide and sustained discussions generated by this publication can be seen in Listservs and from general Internet sources that advertise speaking engagements involving the author, Steven Mithen. Truly consistent with his beliefs that Neanderthals were not capable of making musical instruments, Mithen vigorously contests the notion that the widely publicized "Neanderthal bone flute" discovered in 1996 is a flute, after his personal observation of it in the National Museum of Slovenia in 2004:

But I wasn't convinced, and concluded that the bone's resemblance to a flute is simply one of chance. So we lack any evidence that the Neanderthals manufactured musical instruments. My own theoretical views suggest that they were unlikely to have been able to do so, although I suspect that unmodified sticks, shells, stones and skins may have played some role in their music-making. (P. 244).

Mithen's personal opinions here are, however, not closed; similar conclusions by independent researchers are necessary in validating and updating them. The case of the bone flute nevertheless represents a significant relief from the overwhelming dependence on secondary sources.

Singing Neanderthals definitely is a courageous compilation and discussion of a huge literature on very complex subject; it brings to light many of the unresolved questions and tentative conclusions on the nature and operations of the brain, particularly how it processes music, and language information. The motional dimensions and the general ontological statuses and relationships among the brain, mind, body, and language will remain beyond the reach of our minds, body, and investigative tools, at least not until we have a better understanding, in concrete ways, of the "mind." The disciplines involved in this project are plural and necessarily so due to the nature of the subject. Continuing team research across the disciplines will be one surepath in which to make reasonable progress toward the quest for understanding the most complex aspects of our humanity, especially when pursued in the context of a larger variety of cultural, individual, and musical traditions.

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