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Chapter four

Singing and Thinking

'Not only does the origin of music deserve as much attention as that of language, but we should not treat one without the other' wrote Steven Mithen in his insightful book 'Singing Neanderthal'. I totally agree with these words, and want to add that not only the evolution of language and music must be studied together, but the evolution of music, human behaviour, morphology, intelligence, language, and speech are all inseparable in human evolutionary history, and therefore must be studied together.

In the previous chapter we learned about the ways in which the history of human group singing is connected to various elements of human behaviour and morphology. I suggested that universal human behaviours such as bipedalism, prehistoric cannibalism, invention of stone tools, use of body painting, dance, clothes, altruism, rituals and religion are intimately linked with the evolution of human choral singing. The list of morphological changes in the human body, associated with the evolution of human singing ability, is even longer, and includes the appearance of head hair, longer legs, naked hairless body, reduction of teeth and disappearance of canines, increase of body size, decrease of body strength, appearance of body odour, patches of hair in armpits and genitals, eyebrows and eyelashes, and changes in voice range.

In the forthcoming chapter we will discuss the intimate links between the evolution of human singing and the evolution of human intelligence, language, speech, appearance of speech pathologies, and finally the human unconscious mind.

So let us start with human intelligence.

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Singing and Intelligence, or Who Asked the First Question?

On 27th August 1977, ten days after Elvis Presley's unexpected death, I was sitting in a small cafe in Kechkemet, Hungary, where I was attending a music festival. This was my first (and actually the only) time I managed to go outside of the Soviet Union and I was very excited. Three very nice young Hungarians, two boys and a girl about my age (I was 23 at the time) were sitting at the same table, also having lunch. They were discussing something very lively. I do not speak Hungarian, so, on a few occasions, when one of them looked at me, I smiled in return. A typical use of a friendly facial gesture if you do not understand the speech, I guess.

After a few minutes of discussion the young Hungarians must have decided it was time to include me in their conversation, so one of them asked me a question. OK, it was now time for me to tell them that I did not speak Hungarian, revealing that I did not understand a word from all their long discussion. So I used the most useful words any traveler will need if she or he does not understand the language of the country she or he is visiting. 'Nem Tudom Magiarul' ('I do not speak Hungarian'), I told them candidly in Hungarian, adding some more of my heartfelt smile. The guy who asked me a question looked at me puzzled and asked me another question. 'Nem Tudom Magiarul, nem yertem Magiarul' ('I do not speak Hungarian, I do not understand Hungarian'), I told them both sentences that my host, the Hungarian composer and pianist, Kalman Dobosh, had taught me for such occasions. The young Hungarian looked at me even more surprised and asked me another question again in Hungarian. At this moment it seemed to me he could not understand my Hungarian. The two others were also looking at me in intense silence and with great curiosity in their eyes. I decided to try English. 'Do you speak English?' I asked them in English and a few seconds later we were all talking to each other in English, discussing the music festival we were all attending. To my pride, they told me that my reply in Hungarian, designed to let them know that I could not understand their speech, apparently was pronounced in such a pure Hungarian accent, that they got an impression that I was Hungarian, but for some reason unknown to them I did not want to speak to them.

I remember wondering that evening how I could understand they were asking me something, as I did not understand a word they were saying. Or, speaking more broadly, how can we distinguish whether a stranger is asking us something, or just saying something that does not need our reply. I remember as soon as the question was pronounced, I *knew* this was a question without even understanding a word. We mostly feel when we are asked a question, even if we do not know the meaning of any of the words. Readers can guess that I am talking about the universal human use of question intonation. The importance of question intonation in human language is well researched. According to scholarly publications, question intonations are used in so-called sentences with 'open meanings' (Cruttenden, 1986:171). These sentences are 'open' because they require somebody to finish the communication with a reply. And this 'openness' is expressed by the use of the rising intonation.

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I think my fascination with the universality of question intonation started on that distant day almost 35 years ago. At that time I was still a student of the Tbilisi State Conservatory, and my interest in traditional polyphony was just beginning. I would not have a clue that many years later I would be seriously interested in the origins of the mysterious phenomenon of question intonation and the human ability to ask questions, and would publish a book with a very non-musical title 'Who Asked the First Question?'

Almost 20 years after that memorable meeting in the Hungarian café, in 1996, as soon as I arrived in Australia, I spent long hours for several consecutive months in the libraries of three Melbourne Universities – Melbourne, Monash and Latrobe, searching for publications about the evolutionary history of question intonation and the human ability to ask questions.

To my complete surprise, I found there was nothing published on the origins and evolution of the human ability to ask questions. Even checking linguistic, psychological, behavioural, sociological and philosophical encyclopedic editions did not provide any results, same as a CD-Rom and Internet search. It seemed that I was the first person 'asking questions about questions'. Since 1996, when I started this search, I have routinely checked at least the indexes in all new encyclopedic editions and books on the origins of human language or intelligence available to me for 'questions,' 'interrogatives', and 'asking questions'. Still with no results. Questions are so natural and so prevalent in every moment of our life and communication that we simply fail to notice their significance for the evolution of human cognition.

Let us make up for our neglect of the basics of human behavior and for the next several pages of this book concentrate on different aspects of questioning behavior in human life and evolution.

If we look at the universals of human languages, we will see that one of the strongest universals is the way humans ask questions. There are two very different techniques to ask questions, (1) the syntactic technique, when you change the order of the words in the sentence to make it a question (like 'We shall go there' – 'Shall we go there?'), and, most importantly for us, (2) the use of the question intonation (like 'Let's go' and 'Let's go?'). According to Noam Chomsky, both techniques are universal for human languages, and asking questions with the use of the question intonation is of particular interest to us.

There are a two facts strongly indicating that asking questions by means of using only the question intonation is the original and the most ancient technique to formulate a question in all human languages:

> (1) Despite the fact that babies from different cultures acquire native languages from their own unique cultural environment, all languages of the world – including tonal, non-tonal, intonational and accented languages, use similar rising question intonation to formulate very popular 'yes-no questions'. There is no exception to this linguistic universal;
>
> (1) Babies of all cultures and all races ask their first question with the use of question intonation, still on one-word stage of their linguistic development and long before mastering even the simplest syntactic structures.

These facts strongly suggest that the development of human ability to ask questions must have happened on a pre-articulatory stage of the development of human language, before our ancestors developed fully articulated speech.

Before we discuss this interesting fact for both the linguistic and musical evolution of Homo sapiens, I must explain that I strictly distinguish 'language' and 'speech' from each other. Language is a system of symbols for transferring, encoding and decoding information. Language can be communicated without speech, with other mediums as well, for example, by gestures, by whistling, by drumming, by Morse coding system, by the system of marine signal flags. Speech is one of the mediums of language, the most economical and widespread, but still the medium only. Scholars generally believe that language must have existed earlier than speech. The appearance of language is considered as a much more important evolutionary change in human prehistory, a true cognitive revolution, than the appearance of speech. The appearance of human intelligence is mostly connected with the appearance of language, not speech.

It is very important for us, that one of the true universals of human musical culture is dialogical forms of singing (Zemtsovsky, 1993). Dialogical forms of singing are widely distributed in both polyphonic and monophonic cultures. Dialogical singing, based on two alternative parties, is obviously reminiscent of the human question-and-answer form of communication, although in a more rigid, canonized, even ritualized form. Many traditional songs, based on antiphonal alternation of singers, do contain questions asked by those who start singing, and the replies come from the responding part.

I believe that dialogical forms of singing and the human ability to ask questions are of particular importance for discussions on the origins of human intelligence and language. Let us now address several topics related to this crucial human ability.

When and why do we ask questions? We ask questions throughout our life. We ask our first questions even before we can articulate what we want to ask, we start every scientific query formulating questions to which we want to find answers, we support everyday communications by asking questions, we have huge libraries and a staggering amount of available information because people are constantly asking different questions and are looking for the answers. Sometimes a question raised in the 16th century was answered in the 20th century; and some of the oldest questions have not been answered yet; we even have a talent to answer questions with other questions. I remember a clever 'Jewish' joke popular in my native Tbilisi: 'Tell me, please, why you Jews always answer questions with questions?' – 'So, do you think this is bad?'

I hope everyone would agree that it is absolutely impossible to imagine human society, human intelligence and language without our ability to ask questions. Without the ability to ask questions our brain would be a closed system, limited by the knowledge of our immediate experience.

Advantages for humans and human groups. Selective advantages are central to any evolutionary processes. Maybe the most important consequence for each 'questioning' individual was that the emergence of the question

phenomenon turned the hominid brain into an open, self-developing system. We start our cognitive development from early childhood by asking questions, and the biggest human minds continue to ask original questions throughout their lives.

If you imagine two groups of humans (or hominids), out of which one group members are asking questions of each other, and the other group members are unable to do so, the difference will be so obvious and important that it would be correct to speak in the first case about a group of humans and in the second case about a group of hominids, or pre-humans.

The evolutionary implications of the ability to ask questions first of all was a revolutionary enhancement of the cognitive ability of a whole group of individuals by means of coordinating the cognitive abilities of the different individuals. This new capacity created a totally new phenomenon – group cognition and mental cooperation.

With the emergence of the ability to ask questions human language gained the last of three main language functions - declarations, commands and questions (sometimes mentioned as imperative, indicative and interrogative functions). It is crucial to remember that two of these functions, declarations and commands, already existed in animal communication.

I suggest that the birth of questioning behaviour was the birth of human intelligence. We can look at the entire evolution of the human species and the development of human society and civilization from the point of view of an exchange of information and the means available in a society to ask each other questions.

The ability to ask questions was the first and truly revolutionary change in the quest to exchange information via direct communication. Human dialogical language, intelligence, mental cooperation and a self-developing brain emerged together with the ability to ask questions. After this we never stopped inventing different ways of asking each other or ourselves questions. At some point we started asking questions using speech (do not forget – we started asking questions before the advance of fully articulated speech!). Then came written language, so our questions could survive time and could be transferred to other places. When published books appeared, many people could learn some of the most important questions of life and the answers to these questions given by the greatest human minds in human history. The telephone made asking and answering more mundane questions very easy. Radio and TV also contributed to this process, although more passively, but the latest technology, the Internet, revolutionized the art of asking and answering millions of questions by millions of people every day. Throughout our history as a species we have been asking questions of each other, of other generations, and even of people from different countries and continents we will never know. We truly are the species that asks endless questions.

Is asking questions a uniquely human ability? This is possibly the most difficult, most interesting and most important 'question about questions'. If our closest living relatives, apes, do not ask questions, we may claim that asking questions is a mental capacity that only humans possess, kind of a 'cognitive threshold.'

Whether apes could ask questions was an important issue in the 1970s and the 1980s. Unfortunately, the ability to ask questions was assessed only in the context of the primates' ability to form a syntactic structures, not as a distinct cognitive capacity on its own right. 'It does not really matter if apes do not ask questions, because we know they can use more syntactically complex utterances' was a kind of consensus among most of the scholars studying chimpanzee communication. I guess this was the central reason why this discussion never led to the acknowledgement of questioning behaviour as the crucial difference between the apes' and humans' mental abilities.

The 1970s and 1980s were booming periods for language experiments, when our non-talking relatives suddenly started communicating with us using sign language and other non-vocal means of communication. The experiments produced impressive results. Scholars discovered that apes could recognize themselves in the mirror as individuals, they could invent new symbols using the signals they already knew, and according to some authors they not only had some elements of syntax and metalanguage, but were able 'to acquire concepts and generate hypotheses and strategies' (Rumbaugh et al. 1994:321). These achievements lead the head of the experiments, Sue Savage-Rumbaugh, to declare, that 'apes posses the cognitive capacities for language but lack the proper organ of expression' (Savage-Rumbaugh et al., 1993:109).

What about questions? It has been documented for a few decades already that the vocabulary of the acculturated apes contains question words as well, like "Who", "What", Where" in Washoe's and Nim's vocabulary (Washoe and Nim are widely known chimpanzees from the early experiments on the language comprehension of Chimpanzees). So it seems almost obvious that apes must be able to ask questions.

Nevertheless, according to the accounts of the experiment authors, apes do not ask questions. Apes understand questions and give appropriate responses, but amazingly they themselves do not use questions and question words in conversations with their human teachers. Analysis of their conversations with humans shows that in human-primate conversations, questions are asked by humans only.

Ann and David Premacks designed a potentially promising methodology to teach apes to ask questions in the 1970s: 'Suppose a chimpanzee received its daily ration of food at a specific time and place, and then one day the food was not there. A chimpanzee trained in the interrogatives might inquire 'Where is my food?' or, in Sarah's case 'My food is ?' (Premack & Premack, 1991 [1972]:20-21).

More than a decade later after writing these promising words Premacks wrote with disappointment: 'Though she [Sarah] understood the question, she did not herself ask any questions – unlike the child who asks interminable questions, such as What that? Who making noise? When Daddy come home? Me go Granny's house? Where puppy? Sarah never delayed the departure of her trainer after her lessons by asking where the trainer was going, when she was returning, or anything else' (Premack & Premack, 1983:29).

Earlier Washoe also failed to formulate and ask questions, though that was one of the aims of the Gardners' project. Despite all their amazing achievements, bonobos Kanzi and Panbanisha do not seem to possess the ability to ask questions either. Given the natural curiosity of the apes, it would be natural to expect that if apes were

able to ask questions, they would be asking plenty of questions, just like young children do.

Interrogo Ergo Cogito. 'Cogito Ergo Sum' – 'I am thinking, therefore I exist' – these famous words are attributed to Rene Descartes (they were actually initially written in French and only later were translated into Latin). In the light of the evolutionary importance of human questioning behaviour I want to suggest another similar Latin saying, with obvious evolutionarily implications:

'Interrogo Ergo Cogito' – 'I ask questions, therefore I think'.

I suggest our ancestors became humans when they started asking questions.

It is a pity we will never know the name of the first individual who asked the First Question to mark the turning point in the long process of human evolution, but we know that the first question was asked by the First Human, the first Homo sapiens. It does not matter whether it was a woman or man. What matters is the huge advantage and the instant gratification that the ability of asking questions would give to the first questioning human being. Most likely this was a result of genetic mutation, although the development of ape and then hominid mental ability, and the increasing complexity of social interactions in hominid groups were heading towards this crucial point, so the emergence of the 'questioning gene' must have been a relatively smooth transaction.

I have already mentioned the fact well known to ethnomusicologists that responsorial singing is one of the strongest universals of human singing traditions. I propose that hominid responsorial singing was the central factor that paved the way for the emergence of the human ability to ask questions.

Questioning behaviour and the developments of TOM (Theory of Mind) are obviously interconnected, although not as directly as it might seem. The fascinating fact about the TOM and questioning behaviour is that children learn the mystery of asking questions long before they show the development of TOM. On the contrary, apes are able to acquire at least some elements of TOM, which appears around the age of four in children's development, but at the same time apes seem unable to learn how to ask questions, which occurs in children's development in the form of the correctly pronounced question intonation before a child even turns one. Questioning behaviour seems to be more species-specific to humans than the development of TOM.

Here are a few more facts and considerations about questions and apes.

- It has been demonstrated that our closest living relatives, chimpanzees and particularly bonobos, understand human questions and can respond accordingly at a level of a human child roughly about 2.5 years old;
- Chimpanzees in the wild have vocalization that has extremely interesting and important elements of questioning behaviour. These are pant-hoots, an enquiry about the whereabouts of other members of the group, and most importantly, it has the human-like terminal rising question intonation, although it is not followed by the 'answer', instead it is followed by the same 'enquiring pant-hoots' from other chimpanzees; (Goodall, 1986:134).

- The reason for the inability of apes to ask questions almost certainly has genetic basis. These limitations do not allow for the mental ability from which apes would learn questioning.
- And finally, we should not forget that the experiments of teaching apes human language are still in progress, so there is always a chance that one of the apes in the future will amaze us by learning how to ask questions. Our closest living relatives already amazed us many times by displaying the abilities we never suspected they had.

Who Could Answer the First Question? This is a methodologically very important question. No evolutionary trait will give any advantage to its bearer if the environment does not support this new trait. If the questions of the first questioning human would stay unanswered, then there would be no survival benefit to the bearer of this new trait.

The answer to this ostensibly difficult question is very clear and easy: experimental studies of ape mental abilities during the last few decades have provided ample proof that apes are very good at understanding questions and answering them properly. Knowing the ability of apes to answer questions, there can be no doubt that our hominid ancestors with bigger brains would be at least as good at answering questions as apes. Therefore, by the time the first human asked the first question, the members of hominid groups were ready to answer these questions. It might sound amazing, but for a few million years our ancestors were cognitively ready to answer questions, although there was no one around to ask them any questions (See also the box 'Are there Any Humans Who Cannot Ask Questions?).[1]

Questions and Protolanguage. Derek Bickerton suggested that before the development of human language our distant ancestors used 'protolanguage', a simple surrogate of contemporary language, where the words were present, but very little grammar or none was involved (Bickerton, 1981). According to Bickerton, protolanguage is currently present among four different categories: (1)

[1] **Are there any Humans Who Can not Ask Questions?**

This question is important in order to learn about the nature of human questioning behaviour. If this ability has a genetic basis then it would be helpful to know in which conditions may humans find it difficult (or even impossible) to learn how to ask questions. Questioning behaviour of autistic people would be very important to check, as according to the available literature, some autistic individuals find it extremely difficult to learn how to ask questions. Williams syndrome is another rare genetic disorder that possibly causes difficulties in learning how to ask questions. What about environmental factors? The tragic case of Genie, a girl who was imprisoned by her father for 13 years in her bedroom provides a crucial insight into the importance of human interaction for human emotional, intellectual and linguistic development. Genie was kept without any exposure to human social conditions longer than the so called critical period of language acquisition (this is a period when a child is about 12 years old). After her rescue from her abusive father (who killed himself after the case went public) Genie was able to make some progress, learnt a few words, but her speech never reached the usual level of human complexity. Importantly for our topic, Genie was not able to learn how to ask questions. The case of Genie strongly suggests that although questioning is most likely a genetic behaviour, social interaction with other humans in early childhood is crucially important to unlock this genetic ability.

trained apes, (2) children under two, (3) Genie and other 'feral children', and (4) users of 'pidgin' languages.

In my opinion these four categories of protolanguage users should be divided into two very different groups: (1) those who do not use questions in their speech and (2) those who use questions. Those who cannot ask questions, are locked inside their own mental world and cannot develop further. On the other side, those who can ask questions have the ability to develop mentally and to become a part of the great information web of humanity. So, according to this criterion, the four groups nominated by Bickerton as protolanguage users must be divided into two very different groups: (1) Trained apes and 'feral children', who do not ask questions, and (2) Children under two and pidgin users – who can ask questions.

It is very important to note that the members of the former group (signing apes, and Genie and feral children) have very different reasons to be in the 'non-questioning' category. Signing apes are in this category because, despite intensive training and learning, they do not seem to possess the necessary innate basis that would allow them to learn to ask questions. Genie and feral children, however, have all the necessary innate basis to learn interrogatives, but due to environmental factors they missed out on the sensitive period for learning questioning. Therefore, ***questioning appears to be innately guided behaviour, in which inbuilt guidelines help the learner***.

How do we learn to ask questions? Learning to ask questions must happen in early infancy, no question about that. Children use the correctly pronounced question intonation before they can pronounce their first words. Are they imitating adult conversations that they hear?

I do not think young babies imitate adults speech. It seems to me that young babies inadvertently 'teach' their parents how to communicate with them in order to introduce them to their questioning behavior. How? If you start speaking to an infant in a serious 'adult' tone for a few minutes, and then start speaking with an emotionally loaded tone with very significant pitch modulations and asking plenty of questions, the response of the infant will immediately change, and the infant will immediately look happier. I think this way, through this kind of feedback, infants encourage their parents to speak to them with exaggerated pitch modulations and ask plenty of questions with rising intonation. This is a phenomenon known as 'baby talk', or 'infant-directed speech', or 'motherese'. Asking questions with exaggerated question intonation is arguably the biggest part of baby talk. So I suggest that teaching infants the mechanisms of asking questions in one of the central functions of motherese (See also the box 'Origin of Language and a Small Question to Noam Chomsky')[2]

[2] **Origin of Language and a Small Question to Noam Chomsky**

American linguist Noam Chomsky suggested that language could have appeared suddenly, as a result of a 'monstrous genetic mutation', and after it appeared, the very first true human with the human abilities of intelligence and reasoning had a tremendous advantage compared to his non-human family and friends. Chomsky has been criticized for his almost creationist views on the origins of language and intelligence by fellow scholars, for example, by Steven Pinker. I suggest that even if we accept the idea of a monstrous genetic mutation, Chomsky's idea still cannot be evolutionarily viable.

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When was the ability to ask questions born? To answer this question, we should remember, that question intonation is one of the most widely distributed language universals all over the world. This universality strongly suggests that: (1) question phenomenon occurred at one place and time, and (2) this happened before the initial dispersal of human ancestors from Africa (about 2 million years ago). Taking into account these factors, any of the human (or hominid) ancestors, not younger than 2 million year old, could have made this critical step in the cognitive development of our species. Homo erectus or the earlier Homo habilis are the candidates for being called the first questioning humans.

According to this suggestion, archaic Homo sapiens (known as Homo erectus) or Homo habilis were the first humans to cross the cognitive threshold, leaving behind the animal kingdom. A number of paleoanthropologists (among them Weidenreich, Alexeev, Jelinek, Wolpoff, Frayer) suggested there is no 'difference of kind' between the cognitive and linguistic abilities of archaic Homo erectus and Homo sapiens. Wolpoff mentions Homo erectus as Archaic Homo sapiens. My model fully supports this suggestion.

So here is a question to Dr Chomsky and the supporters of his idea of sudden origin of language:

Would a neurologically fully human child, born in a family of non-linguistic primates, be able to develop language faculties just from the new genetic abilities, without any language speakers around in the early years of infancy?

Child development experts would unanimously answer this question: even a person with such extraordinary mental abilities as Noam Chomsky himself, would not have been able to develop a normal human language if he was not surrounded during his childhood by members of his own humanly speaking family. Genes are not enough. Every human child needs a human environment and humanly communicating adults to develop her or his genetically wired principles of 'universal grammar'. I fully agree with Steven Pinker's Darwinian approach towards the origins of language (although I strongly disagree with his dismissive attitude towards music). The emergence of language was a long and complex process, involving the gradual evolution of a whole set of elements of primate and then hominid communication.

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Music, Speech, and Other Mediums of Language

The only serious alternative to pitch-based musical communication as the early medium of language, is the so-called 'gestural' theory of language origin. According to the proponents of the gestural' theory of language origin, the evolution of human language went through a gestural phase. The gestural theory had several attractive sides:

(1) First of all, it was believed that apes do not have voluntary control over their own vocalizations; therefore it was assumed that when our hominid ancestors wanted to communicate more complex ideas, they would not be able to use their vocal tract and had to turn to other means of communication, such as gestures.

(2) Another important point for the support of gestural theory was the lateralization of musical abilities and human language in different brain hemispheres. The idea that language (lateralized in the left hemisphere) could not be related to our vocal abilities (lateralized in our right hemisphere) was perceived as hard neurological evidence against the vocal theory.

(3) Most importantly, the boost for the gestural theory came from the groundbreaking experiments in teaching apes American Sign Language. Apes suddenly started communicating with the experimenters, answering their questions, following the directives of their trainers, and even constructing rudimentary sentences with sign language and other non-articulatory means of communication. This fact was a living proof of the ability of our very distant ancestors to start more advanced communication via gestural and other non-vocal channels.

Belief in the involuntary nature of ape vocal communications is not so strong any more among scholars, as information about voluntary control over vocalizations among apes is growing. Even Kanzi, a bonobo that provided some of the most remarkable examples of an ape's ability to comprehend human language, also provided evidence that apes can control their vocal chords as well as their hands. It was noticed that every time Kanzi communicated with humans with specially designed graphic symbols, he also produced (obviously voluntarily) some vocalization. It was later found out that Kanzi was actually producing the articulate equivalent of the symbols he was indicating, or, in other words, he was saying (articulating) these words, although in a very high pitch and with distortions, so it was not easy to notice this.

Regarding the localization of musical abilities in the right hemisphere and of language in the left hemisphere, a few new facts came to our knowledge, revealing that when music signals are learned from early childhood, they are localized in the left hemisphere both in humans and animals:

- Avian birds acquire their species-specific songs during the earliest period of their development. As a result, their songs are controlled by the left hemisphere of their brains;
- Most professional musicians learn music consciously from quite early childhood. This must be the reason why there is lateralization of part of their musical knowledge in the left hemisphere;
- The intonation of tone languages is learned in early childhood, long before the acquisition of articulated sounds of speech. As a result the system of tones among the tone-language speakers is also localized in the left hemisphere.
- Study of normally functioning brains, when the areas involved in different activities are identified, provide important proof of close links between music and language processing in our brains.
- We also need to take into account that, in regards to vocal communication, our noisy and singing-loving ancestors were very different from mostly silent and non-singing apes.

As to the brilliant works concerned with teaching ASL (American Sign Language) and other non-vocal forms of communication to the apes, they provide us with a unique possibility to understand the cognitive capacities of our closest living relatives, but they can hardly tell us much about the early history of the development of language among hominids. The situation of one species teaching a higher language to another species is evolutionally artificial. Our ancestors had not been taught a higher language by someone else. They developed language themselves simultaneously with the development of their cognitive abilities and gaining cortical control over their vocalizations.

An additional argument against the gestural theory is the overwhelming advantages of the vocal medium over gestures. They are well known and widely accepted by proponents of both vocal and gestural theories, although the proponents of gestural theory prefer to talk about 'speech' in this context. Let us listen to one of the main proponents of gestural theory, Gordon Hewes: 'There are several obvious advantages of speech over manual gestures, including the fact that the vocal auditory channel is practically a clear channel for communication, whereas the visual channel, as the prime modality for human and all higher primate perception of the external world, is subject to continual interference from non-language sources. Unambiguous decoding of gestural messages requires a fairly neutral background, good illumination, absence of intervening objects (including foliage), a relatively short distance between transmitter and receiver, and frontal orientation. Making manual gestures is slower than speaking, requiring more energy, and preventing the use of the hands for any other activity while the message is being transmitted; decoding sign-language message is also slower, even among trained deaf persons' (Hewes, 1973:10). All these facts were provided by Hewes to prove the necessity of the later change of the gestural medium into speech, but it is logical to ask why would our ancestors shift from a primary vocal channel to gestural communication in the first place, when it is clear that the same long list of advantages over the manual gestures are characteristic for the archaic hominid vocal communication as well?

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Pitch-Based Language:

Singing, Whistling, Drumming

We all know instances where language functions without speech, although we may not always pay attention to this fact. For example, people who communicate by means of sign language use fully developed sign language, but not speech. Communication with the Morse coding system of the early telegraph, based on the use of dots and hyphens, or the system of marine signal flags between ships are different examples of the use of language without speech. Speech is just one of the mediums of language, although by far the most economical, fast and universally employed in all human societies. Almost all the non-speech mediums of language were developed very late in human history. Sign language was officially developed after 1755 in France when Abbe de L'Epee founded a public school for deaf children. The Morse coding system was developed in the 1830s by Samuel Morse and Alfred Vail. The system of Marine Signal Flags was developed in 1855 in England by the British Board of Trade.

Pitch language, based on pitch modulations, or musilanguage (the term was suggested by Steven Brown in 2000 and is currently widely used by scholars), seems to be the only alternative medium of language that can compete with speech in universality and chronological depths in human history. Unlike sign language, Morse or Marine Signal Flags, pitch language used the same vocal channel that was later employed by speech, which is why, after the introduction of speech, a much more efficient medium for language, all known human societies shifted to speech, and today it is very difficult to find any traces of the 'past glory' of pitch language.

Fortunately, there are still some traces of pitch language left in contemporary human societies. Here is a brief account of three such instances where very precise ideas are communicated by means of pitch only.

1. Whistle languages. George Cowan presented a fascinating dialogue between two villagers from Mexican Mazateco Indians.

Here is the literary translation of the whole dialogue:

'What did you bring there?'
'It is a load of corn.'
'Well, where are you going with it?'
'I am taking it to Tenango.'
'Are you going to sell it then?'
'I am going to sell it.'
'How much will you take then? Sell it to me here.'
'I will take 2.50 a box' [pesos]
'Won't you take 2.25? I will give that to you'.
'Three pesos are given to me where I am going with it'
'But that is far you are going with it then.'
'I will just drop the matter now'.
'Well, you sure want a lot'.

'What is so fascinating in this dialogue?' a reader might say. True, this is a quite mundane commercial agreement, but there is one unusual fact: not a single word was pronounced during this whole conversation. The Indians were using a whistle language, or a purely pitch language, used for everyday human communication when the communication on the distance was needed. The same phenomenon can be encountered in plenty of other countries and regions of the world: in Brazil, Bolivia, Alaska, Nepal, Burma, New Guinea, France, Greece and most of all – in many West African peoples. This kind of communication generally occurs among the users of tone languages, and it is based on the use of a tone element without the articulated component of speech. There are also very interesting cases where the whistle language is used in non-tone languages as well, as in some Spanish, Turkic, or Greek villages.

2. African Talking Drums. Africans use the so called "talking drums" in order to communicate over long distances, as a method of spreading important news between villages. Two drums with different pitches are used to send messages. Very much like in the case of whistle languages, talking drums also use the tonal patterns of their speech. The existence of drum languages also proves that pitch-only based communication can function in human society. A very interesting detail of African Talking Drums is that different African tribes, who speak different languages, often use a more universal Drum Language, which sometimes employs earlier, already extinct words and expressions of the local languages.

It is important to remember that speakers of tone languages never speak without the use of the tone element, whereas, as we can see, in whistle languages and African Talking Drums they can successfully communicate with the use of the pitch element only, without the articulated component of the tone language.

It is a pity that in many ways the innovative and insightful book of Steven Mithen, 'Singing Neanderthal', does not even mention either whistle languages or African Talking Drums, both of which could further promote his idea of the importance of music in the evolution of human language. Most likely Mithen, despite his genuine efforts to promote the idea of the importance of music in the evolution of human language, sees music only as a 'non-referential system of communication', without even discussing the referential potential of pitch-based communication.

3. Tone languages. If whistle and drum languages are present in only a limited number of regions of the world, tone languages constitute in fact the majority of world languages. Virtually all sub-Saharan languages, most East Asian and some South American Indian languages are tonal. In total, more than half the languages of the world are tone languages. In these languages the tone component is very important for both the morphology and the syntax. The lexical use of tone is widespread in all tone languages, but the grammatical use of tones, such as singular and plural forms and present and past tenses is more typical of the many languages of Africa.

In tone languages, as well as in other non-articulated means of pitch communication (whistle and drum languages), pitch contour has nothing to do with the emotional content usually attributed to music and singing. An emotional element of tone is also present in tone languages, but it is independent of the lexical and grammatical meanings. So, we may say that in these languages tone (pitch) is

employed as a double-component system, overlaid on each other: (1) the first component has a referential lexical (and sometimes grammatical) function, and (2) the second component has a general-emotional, non-referential function. In contemporary tone languages both functions of pitch modulation are clear, and they are overlaid on each other in a flow of speech.

It seems that during the last major evolutionary change of human communication, when the so-called fully articulated language came into existence, articulated speech did not fully replace the older pitch-based language. A number of linguists believe that the system of tones has a late origin, suggesting that tonogenesis went through replacing some lost elements of speech with tones (for example, voiced consonants were replaced by low tones). Imagining the earlier speech devoid of tones, and then acquiring tones only later seems to be against the general historical dynamics of the development of vocal communication. I need to say here that linguists also note the cases where tones are lost during language development. Therefore, tones are quite a dynamic phenomenon and can be lost and acquired.