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Part 3

Singing, Questioning, Thinking, Talking, Stuttering

Brief summary instead of introduction

Going back in our prehistory chapter by chapter, we are getting closer to the origins of human choral singing. In the first part of this book we reviewed the contemporary stratification of vocal polyphonic traditions. In the second part we discussed a few historical issues connected to traditional polyphony. In this, the third part of the book, we are going to discuss the origins of human choral singing in the wider context of the evolution of *Homo sapiens*.

Discussing contemporary stratification, we found out that polyphonic and monophonic singing traditions are represented roughly equally on our planet. This does not mean that both polyphony and monophony are equally represented in every continent and every major region of the world. On the contrary, some major regions are "extremely polyphonic" (like sub-Saharan Africa, the mountainous regions of Europe, and Polynesia), and other regions are almost entirely monophonic (like East Asia, or Australia).

In the second part of this book we conducted a series of comparative studies, and came to a number of conclusions, including conclusions about the stability of vocal polyphony, "primary" and "secondary" forms of polyphony, and the role of migrations in shaping the contemporary stratification of polyphonic cultures. Most importantly, we came to the conclusion that the general historical tendency of vocal polyphonic traditions is **gradual disappearance**. We found that historically well-documented cases of the decline and disappearance of vocal polyphonic traditions come from every continent of our planet. The facts of the gradual disappearance of vocal polyphonic traditions that I presented must be only a tiny tip of a huge iceberg. On the other hand, documented cases of the evolution of vocal polyphony from monophony are absent. This tendency strongly suggests that our planet is getting more and more monophonic with every decade, century and millennia. Therefore, I

suggested that the belief of music scholars about the late origins of vocal polyphony from monophony is not supported by the existing facts and must be discarded.

According to my model, **the earlier we go in human and hominid prehistory, the more polyphony will be found, and ultimately, the origins of polyphony must be somewhere in the very process of the evolution of our human ancestors in Africa, before their dispersal throughout different continents of our planet.** Before we start addressing questions about the age and the evolutionary reasons for the origins of vocal polyphony, I would like to discuss the hypothetical "primordial polyphony" that must have been shared by the first representatives of our ancestors that stepped out of the African continent about two million years ago.

Sounds of the Ancient Choir: Primordial Vocal Polyphony

Any reconstruction of a "primordial language" or a "primordial culture" is a highly speculative business. Reconstruction of "primordial" polyphony is not much different. To reconstruct a phenomenon that according to my model existed many hundred of thousands or even millions of years ago, we need hard evidence, which is unlikely to ever enter our knowledge. The only possibility for such a deep historical reconstruction is to find some common features that characterize a big part of the live vocal polyphonic traditions from different parts of the world.

When we look for common features, we need to remember that the phenomenon itself – vocal polyphony – is in a long process of decline and disappearance. Vocal polyphony, for some evolutionary reasons once a much-needed phenomenon, lost its "survival value" at some point of human prehistory. Another interesting point is that, according to my model, some human populations started losing polyphony much earlier, while other populations kept it for a much longer period of time. As a result, in some populations the tradition of vocal polyphony is already lost (for example, East Asians and native Australians), and other populations are on the same historical route as well. We will discuss the reasons behind this evolutionary "change of luck" of vocal polyphony and the reasons why populations started loosing polyphony in different times later in this part of the book.

But let us take one problem at a time. The first in line is the reconstruction of the hypothetical "primordial polyphony" that could have been the common ancestor of all (or at least most) polyphonic traditions.

Here is a list of the possible characteristic features that could be present in our distant ancestors. This list was compiled after a comparative study of vocal polyphonic traditions from different regions of the world, and particularly the singing traditions of two major polyphonic "families" – sub-Saharan African and European.

We will be taking into account the "primary" and "secondary" forms of vocal polyphony we discussed in the second part of the book.

- The choral singing of our distant ancestors was most likely based on the **antiphonal and responsorial alternation** of two groups, or of a soloist and a responding group. This is a true universal feature for both polyphonic and even monophonic cultures and there is hardly a human musical culture on our planet without any elements of the deep-rooted tradition of responsorial singing.

- Choral singing must have **included everyone**, all layers of society. This feature is very characteristic for traditional polyphonic cultures, where everyone is expected to participate at some level and there are no formal listeners at all. For many representatives of polyphonic cultures even just listening to somebody else's singing is not natural, and they try to sing along (or tap along) together with the performers. Singing of women only (or men, or other social groups) seems to be a relatively late phenomenon.

- The **rhythm** of choral singing must have been very **precise and vigorous**. This feature is by no means universal for all surviving polyphonic traditions. For example, several Mediterranean polyphonic traditions that bear signs of the mixture of the old European and Middle Eastern monophonic singing traditions have a non-precise "rubato" rhythm. At the same time, most of the polyphonic traditions that do not show signs of the mixture with Middle Eastern type monophonic music are based on precise rhythm. Precise rhythm is absolutely dominates in sub-Saharan singing traditions, and in many European and Polynesian polyphonic traditions.

- The choral singing of our ancestors most certainly was **accompanied by a dance**, clapping and generally bodily rhythmic movements involving all participants. This kind of syncretic unity of singing and dancing is conspicuous in all more or less archaic musical traditions. This ancient syncretism must have very deep roots in our consciousness, as even today when we hear the rhythmic music, we instinctively want to follow it with tapping, stomping or bodily movements.

- The use of **body percussion** is also highly probable for the ancient communal singing of our ancestors. Even higher is the possibility of group stomping, creating a steady basis for the singing rhythm. When we hear rhythmic music we have an urge to follow it, and stomping is one of the basic and most usual means to do this.

- The singing style of our ancestors most likely was **loud and straight.** Most archaic polyphonic singing traditions are still extremely loud. With every member of the society participating in singing, dancing and clapping you would not expect to hear the sombre sound of the quiet and gentle choral music.

- I think we can talk about the rhythmic characteristics more precisely. As most sub-Saharan Africa music is almost exclusively is based on **duple rhythms (2/4, 4/4)**, and the same is true for many west Georgian polyphonic traditions, and this simplest rhythm is arguably the most widespread in different cultures of the world (both polyphonic and monophonic), I suggest that duple rhythm could be a part of ancient common polyphony as well.

- The tempo most likely was **became faster** during the performance. This feature is a usual part of archaic dance-songs. They start at a relatively slow or medium tempo and the tempo gets faster and the pitch rises during the performance in growing excitement.

- The **type of polyphony** is naturally a very important feature for our topic. Out of the "primary" types of polyphony we can consider types such as drone, parallelism, and ostinato as the possible initial elements of the archaic polyphony. Not all of them show universality in the most important polyphonic regions. Here are my considerations on these types of polyphony:

- **Drone** could be a good nominee for the claim of the primordial universality, but the whole sub-Saharan Africa, this most active "heaven of traditional polyphony" is almost totally "drone-free" and therefore makes the drone's claim on ancient universality very dubious. By the way, the west Georgian Svanetians, arguably one of the best survivors of ancient polyphony in Europe, are also not very keen on the use of the drone type of polyphony.

- **Parallelism** that dominates sub-Saharan African polyphony is present in many polyphonic traditions in other parts of the world and could be another good nominee for universality, but the European polyphonic tradition's obsession with the drone (and not so much parallelism) casts some doubts on parallelism as well. Although it is important to note that, arguably, one of the most archaic and the best preserved European polyphonic traditions, those of the west-Georgian Svanetians from Europe's highest Caucasian mountains, use more parallel than drone polyphony. This fact definitely increases the strength of parallel polyphony's claim on ancient universality.

- Of all types of polyphony we can safely say that **ostinato is the most universal type of vocal polyphony** that was (and is) present in most traditional polyphonic cultures. There are hardly any polyphonic traditions that do not employ the ostinato principle to some extent. Therefore, the hypothetical primordial polyphony must have been heavily based on ostinato principle.

- I have to suggest that there was **no separate function of a bass** in the ancient primordial polyphony of our ancestors. If this idea seems too controversial to the informed readers, I would like them to pay attention to the fact that Sub-Saharan African polyphonic singing does not seem to be using a **bass as a functionally separate part**. It is more a "lowest part" in sub-Saharan parallel polyphony than a distinct "bass" as we know it from many other cultures from around the world today. The Pygmies' singing knows no base part either. Even African ostinatos are not necessarily in a lower register. It seems to me that the apparently late appearance of a drone was connected to the relatively late appearance of the function of a bass in the evolution of polyphony. Besides, the drone initially could have appeared as a long (pedal or recited) sound in the middle and high ranges, not necessarily as the lowest part.

- The yodel also has a claim for inclusion among the characteristics of the ancient polyphony. It is by no means distributed in a lot of cultures, but nevertheless, different forms of yodel are present in isolated pockets of European, sub-African and even Pacific polyphonic cultures.

- Verbal text must have been absent or kept to a very minimum in this primordial polyphony (as it is in the polyphony of the Pygmies). Interjections and nonsense syllables must have been prevalent at this stage.

- It will not be very original for me to suggest that the more likely scale basis for the most ancient form of primordial polyphony could have been an anhemitonic pentatonic.

- Another specific feature that could unite the big European and African polyphonic families seems to be the **principle of third substitution** of the melodic tones. This principle is at work in such polyphonic cultures as faraway from each other as the San (Bushman) from South Africa, Georgian, and European professional polyphony.

So, to summarize, we have the following description of the ancient "primordial", or "proto-polyphony":

This was loud, responsorial singing of a large mixed group, rhythmically very precisely organized (most likely in a duple rhythm), accompanied by rhythmic movements, stomping and body percussions. The tempo rose during the singing/dancing, as well as the pitch, together with the general dynamics. Polyphony was based on ostinato, and possibly on parallelism, there was little or no text (mostly interjections), and the function of a bass was not yet separated.

This characteristic raises one specific question that needs to be addressed later in the discussion. This is a **precise rhythmic organization of human singing activity**. As we have already mentioned, there are quite a few species on our planet that can sing and create new melodies. Some of them could even beat humans in melodic creativeness and complexity. But **what makes human musical activity unique is the very precise metro-rhythmic organization of musical texture**. No other species on our planet have such a vigorous and precise sense of rhythm. As Estreicher once noted, Africans have an "in-built metronome" that gives them an extremely precise sense of rhythm (Estreicher, 1964). I think many would agree with me that this is a characteristic feature not only of Africans, but of humans generally. As the animal kingdom around humans does not provide such examples of precise rhythmic sense, there must have been some evolutionary forces at work that were

responsible for the creation of this unique "metronomic" precision in the brains of our ancestors.

Another interesting problem, connected with the same rhythmic nature of human musical activity, is the almost **hypnotic influence that loud and simple beat has on our brain and body**. It is not only the human's good sense of rhythm that is amazing, but also the strong urge to join in this rhythm by stomping, dancing, drumming, or finger snapping. I do not think that our psychological "addiction" to strong rhythms could have arisen together with the relatively late developments of musical "culture". There must have been other deeper and more evolutionarily important factors at work that created this phenomenon. We will address this very important question very soon.

Few Preliminary Questions and Answers

Now, in the third, final part of this book, it is time to ask directly the most difficult questions and to hear if there are any straight answers to these questions:

- **When was the phenomenon of vocal polyphony born?**
- **Why was the phenomenon of vocal polyphony born?**
- **Why is the tradition of vocal polyphony disappearing?**
- **Why is the contemporary distribution of the tradition of vocal polyphony so uneven throughout the different continents and regions of the world?**

Before we discuss these and many other problems in more detail, here are the extremely brief answers on these questions:

- **When was the phenomenon of vocal polyphony born?**

According to the proposed model, there were at least two stages in the development of "proto-polyphony". The first elements of future human choral singing must have appeared first after separating the lineage from the great African apes, around 4-6 million years ago (the first stage). The evolutionary paths of non-singing apes and singing human ancestors were forever separated. The second stage was the more important, when a rhythmically precisely organized group singing tradition was

established after our human ancestors descended from the trees to the ground. This was long before the appearance of *Homo sapiens*. Humans did not create polyphony. We may even say that vocal polyphony was a major contributor in creating human society and even human language and intelligence.

- **Why was the phenomenon of vocal polyphony born?**

We could ask this question in other words as well: what was the survival value of polyphonic group singing? According to the proposed model, vocal polyphony (more precisely, the inseparable unity of group singing and dancing) was born primarily as a strategy for the group defence of their lives and their territories from the major predators of Africa. This defence was badly needed after our human ancestors moved from the trees to the ground and exposed themselves – slow-running and not-so-well-armed primates – to the formidable African ground predators. The best evolutionary chance for our human ancestors to survive at the dangerous "ground level" was the strengthening of social bonds within social groups, increasing group size and a new impressive "lion dance". Choral singing at this stage (before the advance of articulated speech) must have been a means of social bonding and stress relief as well, but I suggest that the primary evolutionary function of choral singing was a strategic defence against major African predators.

- **Why is the tradition of vocal polyphony disappearing?**

According to the proposed model, after humans shifted to articulated speech, vocal communication was marginalized as a redundant system of communication. Mind that I strictly separate language and speech. As a result, human musical abilities started to decline. Early selection for better singing abilities and sense of rhythm was replaced by selection for precise articulation. Primordial polyphony gradually shifted to the realms of human musical "culture" and started disappearing millennia–by millennia, century–by century, and decade–by decade.

- **Why is the contemporary distribution of the tradition of vocal polyphony so uneven throughout different continents and regions of the world?**

According to the proposed model, the uneven distribution of vocal polyphony throughout our planet is connected to the peculiarities of the origins of articulated speech in different human populations. Articulated speech appeared long after the emergence of human language and intelligence, and long after humans left their homeland in Africa. According to the suggested model, **different populations of *Homo sapiens* shifted to articulated speech in different epochs**. Therefore, the process of the disappearance of vocal polyphony started in some populations earlier than in others. According to the suggested model, East Asians and Australian Aborigines were the first to shift to articulated speech (or spoken language), followed by European and sub-Saharan African populations.

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Discussing these and other related topics, we will often leave the borders of musicology, sometimes going into problems that are much bigger than the problems of the origins of vocal polyphony. I am sure that, in the same way as the origin of language is not only a linguistic problem, the origin of vocal polyphony is not a musicological problem only.

Now we are ready to discuss these issues in more detail.

Singing Ape

Not everyone has a voice but everyone makes noises to communicate. I remember when I lost my voice during a bad bout of influenza few years ago, I clicked my fingers to get attention from family members. A huge number of species, co-residing our planet, do not have voices at all. The buzzing of mosquitoes, for example, is not designed to scare us on a hot summer evening. It is an important means for mosquitoes to find each other for the sake of future generation of little bloodsuckers.

Sound perception and voice production are so intimately linked with each other that it is often overlooked that these two phenomena were acquired in very different epochs of our evolutionary prehistory. Sound perception appeared at a very early stage in the evolution of the animal kingdom. Even insects are equipped with organs of sound perception. Our vocal ability of sound production is much "younger" than the ability of sound perception (“much younger” in this case is about 500 million years younger). One of the consequences of the non-synchronous development of organs of sound perception and voice production is that “...although the vocal tract has undergone significant changes in morphology over evolutionary time, our peripheral auditory system has remained in a relative state of stasis” (Hauser, 1996:219). In the evolutionary process a real voice (produced by the vocal chords) first appeared among amphibians. Insects and other living beings, that lack voice, communicate with sounds created by different parts of their body.

Sound perception has always been more important to living beings than voice production. Even if you are a teacher or a professional singer, you would not be spending more that 10-15 per cent of your total time talking or singing. According to Pease (1984:9) the average person talks about 12 minutes a day. OK, I agree that we all may know some exceptional individuals who do not fit this average, but anyway, our ears are much more active that our vocal tract, because our ears receive different sounds all the time, even when asleep. Besides, we can produce only a relatively small range of sounds ourselves, but we can easily distinguish thousands of different sounds that come to our ears from different sources every moment of our life.

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Evolutionary “asynchrony” is a powerful factor that affects our abilities often without realizing that the acting force behind some contemporary events and problems is our evolutionary past. For example, because of this “evolutionary asynchrony” sound perception is represented among animals (and humans) much better than voice production. Let me briefly discuss three examples:

“No, sorry, I can not sing!” As a music teacher and a choir leader for a number of years, I have heard these words many times from my students, sometimes from very musically talented ones. Is this possible? Good musicians who cannot sing in tune? Yes, it is possible. Some individuals (I believe some are among the readers of this book as well) can hear musical compositions and distinguish even the smallest errors in pitch during a performance, but they still cannot sing a simple melody in tune. Such individuals are sometimes labeled as "being without a musical ear". This is not correct, because an inability to sing in tune is not connected with problems of the ear, hearing and musical creativity. This is a problem of **voice production**, which is a distinct phenomenon.

Individuals with incorrect pitch production can even be great musicians. Well-known German composer Richard Wagner is a perfect example of this kind of discrepancy between outstanding musical hearing (and creativity) and incorrect voice production. Wagner was unable to sing even his own melodies in tune. I believe the "Wagner Ear Phenomenon" is connected to the evolutionary asynchrony between the origins of sound perception and voice production. The real absence of musical ear (”pitch deafness”) also exists, although it is much more rare among humans. Pitch deafness always causes incorrect voice production, while incorrect voice production does not necessarily mean pitch deafness. (By the way, according to my own observations as a choir-leader, it seems to me that men suffer much more from the inability of precise tone control than women.)

Well, music history knows more extraordinary cases as well. Arguably the greatest composer of all times, Beethoven was completely deaf by the time he wrote his 9th Symphony, arguably the pinnacle of human musical creativity. Deaf composer sounds as paradoxical, as a limping footballer with one short leg, or a guitar player with non-functioning fingers, although human adaptability has no limits, and like Beethoven, Garrincha, a Brazilian footballer, and Jango Reinhardt, a Gypsy guitar player, were among the all-time greatest performers in their fields despite their physical limitations.

So, dear reader, if you cannot sing in tune, this does not mean you cannot be a musician. If you love music, you can still play an instrument, or compose, or, if you cannot do any of these, as we musicologists say, “you can always become a musicologist”.

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"I want my fis!" Those of us who has been privileged in our lives to have children might still remember some of the cute names that our children used to indicate different things. Would it be easier for our children to understand us if we speak to them their own "cute language"? Apparently not. Scholars who study the problem of the acquisition of language and speech by children, indicate that young children can hear (and decode) articulated signals (words) much better and earlier than they can pronounce them (Menyuk, 1972:14, 28; Morais, 1991:61-62). Here is a classic conversation between a child and an adult about an inflated plastic fish: "'This is my fis'. – 'This is your fis?' – 'No, my fis!!' – 'Your fish?' –'yes, my fis!'" (Berko & Brown, 1960:531). The child, hearing and understanding the correct pronunciation of "fish", still cannot pronounce it correctly. This phenomenon, known as the "Fis Phenomenon", is another outcome of the evolutionary "asynchrony" of the origin of sound perception and voice production. It was suggested that even before a child can produce single word utterances, s/he can comprehend syntactic structures, or sentences (see Golinkoff et al., 1987)

"My dog understands me!"

Many dog owners would agree that it is enough for our dog to hear the word "walking" or "outside" (even without talking to them directly) and they instantly show with all their communicative skills that they are extremely happy that their master has finally made the best decision of the day. This is another well-known outcome of evolutionary "asynchrony" of the origins of sound perception and voice production: many animals (e.g., cats, dogs, horses, apes) can distinguish spoken signals and react to them, but they cannot produce articulated sounds themselves. Kanzi, a bonobo, a smaller and much more peaceful relative of the chimpanzee who puzzled many defenders of human uniqueness, successfully proved that he can react not only to simple speech signals (like "go" or "give me…"), but can understand and react adequately to very complex new sentences like "Give the doggie some carrots", or "Put the toy gorilla on the pot" and "can you throw the dog to Kelly?"(Savage-Rumbaugh et al., 1993:116). Panbanisha, Kanzi's stepsister, proved that Kanzi was not a single genius among the bonobos. Alex, the grey parrot, proved that you do not have to be a relative of humans to comprehend at least a few human words and even to use them properly.

Not unlike animals, humans can also learn to understand plenty of sounds made by other species as well. This knowledge sometimes can be life saving. Everyone who has read Jim Corbett's brilliantly written accounts of hunting man-eating tigers and leopards in the Himalayan foothills in India, will remember that his life often depended on his ability to hear and correctly understand other animal's calls (like cheetal and kakar), indicating the presence and location of a man-eater. Our distant ancestors, living closer to the nature, were definitely much better at "reading" animal sounds than we are today. Animals can also distinguish calls of other species and use the information contained in these calls successfully in their everyday life without the ability to produce these calls themselves. Of course, animals that can **copy**

other species calls can use this ability for their advantage, like the same Jim Corbett, who attracted his last man-eating tigress by making a call of a tiger looking for a mate.

Still, making vocal sounds for communication does not mean singing. "Although it is often stated that man is the only primate that can talk, it is rarely noted that he is also the only one that can sing" wrote Frank Livingstone rather controversially in his 1973 article, arguing that the Australopithecines mostly communicated by means of singing. Singing as a means of communication in our non-talking ancestors has been investigated by other scholars as well (see, for example, Otto Jespersen, 1895; Brown & Greenhood, 1991; Richman, 1993, Mithen, 2005). In comparison with the ubiquitous vocal communication among animals, singing is a much more complex phenomenon. And despite this complexity, singing is still present in many unrelated species (like the humpback whale in the ocean, the flying nightingale and the gibbon from the jungle treetops (see Marler, 1970, 2000; Nottebohm, 1971, 1972; Bright, 1984; Geissmann, 2000; Payne, 2000). Maybe the species closest to us that can "sing" is the gibbon. The conspicuous absence of singing among the great African apes suggests that humans developed singing abilities later, after separating from our closest living relatives about some 6 million years ago. Thus, the singing of the geladas (Richman, 1976, 1978, 1987), gibbons and siamangs (Gittens, 1978; Geissmann, 2000), as well as birds (Marler, 1970, 2000; Nottebohm, 1971), humpback whales (Payne, 2000) and humans are analogues, not homologues. It is difficult not to agree with S. Pinker that "in the tree of life, traits like eyes or hands or infinite vocalizations can arise on any branch, or several times on different branches, some leading to humans, some not" (Pinker, 1997:189). It is also obvious that singing is not connected to higher intelligence, and that singing arose in different species independently from each other.

Singing Rabbit and a Lion Dance: Origin of Rhythm

The evolutionary cost of singing is quite high. You must be big and strong to habitually afford singing-like loud and long vocalizations (like lions, wolves, whales). There is another option if you are a singing lover – you must be able to fly, like avian birds, or at least, be able to take a quick refuge high on a tree, like gibbons. So, if you are not big and strong, or cannot fly, of quickly escape high into the trees, you'd better shut up and be as quiet as possible if you want to survive. A singing rabbit would not reach an old age.

Living on the trees, our ancestors were on a safer "high floor" of the jungle ecosystem. In the trees you can live according to your weight (are you lighter? – you can live on a "higher floor" or thinner branches and be safe from heavier predators,

who can only hunt on "lower floors" or bigger branches). When our ancestors descended from the trees and started walking upright, the situation changed drastically. Animals of all sizes and shapes share the space and struggle for existence on the same "ground level". Colonizing the ground, our ancestors were not big and strong enough to stand against the big predators like lions, and good climbing trees were not always nearby when needed. So, why on earth would they sing? It is clear that singing would **attract** predators.

Steven Mithen criticized Bjorn Merker's idea, who suggested that the foundations of human musical talents were laid when our hominid ancestors started group singing to attract females (Merker, 2000). Mithen argued: "The problem with Merker's ideas is that synchronous calling by hominids in order to attract mates would also attract predators, as would long-distance calls by lone hominids. We know that hominids on the African savanna were competing for carcasses with carnivores, and that they often became the prey themselves. The idea that they would have synchronized their calls to attract wandering females and to deter groups of other hominid males seems most unlikely, especially when the relatively open landscape constrained their ability to escape from predators by climbing trees. A far more likely strategy for such hominids would have been to keep quiet and hope that the prowling carnivores would pass them by (Mithen, 1005:207).

Merker's idea of hominid males calling for females is controversial for another reason as well. Although singing to attract females is quite widespread in the animal world, it does not seem to be the main purpose of hominids prehistoric group singing. In such species, where males try to attract females by their vocal talents (as Merker suggests), singing is mostly used in a **competitive context** between the males (or male groups), and understandably only males usually sing elaborate songs (which is the case in most of the avian birds). Among humans both men and women are ardent singers, and in fact in many regions of the world group singing and vocal polyphony has survived primarily in women's repertoire. This fact strongly suggests that singing must have had a **cooperative** (and not competitive) character in our hominid prehistory. Of course, competition is one of the main driving forces in everything humans do, and singers and choirs in every society do compete with each other in different settings: at village weddings, on pop-charts and during big festivals. But as a phenomenon choral singing must have been born in human prehistory out of **cooperation of the whole group, not competition between the males or male groups**.

Let us go back to our distant ancestors. We have just read Mithen's words about the dangers of group loud singing in African savannah. And still, most likely, hominids continued to sing. Were they trying to attract predators? No. I suggest **they were singing to *avoid* predators**.

Let me explain. For such "singing primates" as we humans are, it is most likely that our distant ancestors started singing quite early. Possibly this was one of the crucial differences that separated our evolutionary line from our closest living relatives, the big African apes of about 6-7 millions of year ago. The open Savanna was not a safe place to encourage singing. So, most likely the singing of our ancestors

was already a group business. We do not need to speculate too hard to imagine the singing abilities of our primate ancestors, as for a distant analogy we can use gibbons, whose family "songs" are well-known among scholars and natives of the south-East Asian jungles. It has been suggested that the "singing" of gibbons serves two main purposes: (1) to maintain social bonds, and (2) to mark their territory from intruders (Geissmann, 2000). Most interestingly for our topic (the origins of choral singing in humans), gibbons "sing" in family duets and trios. The family ensemble consists of the adult couple, sometimes with the offspring joining in as well. Our primate ancestors, most likely, lived in small groups, like chimpanzees and gorillas, so their singing groups could have been a case of an "extended family" ensemble. At that stage, I suggest that group singing was not yet organized rhythmically and was not so different in this regard from other singing birds and animals. The rhythmic precision of human group performance (singing and dancing) is quite an exclusive phenomenon in the animal world and it seems to have originated when our ancestors moved to the ground. We shall discuss this issue now.

As soon as our ancestors descended from the trees, they faced mortal danger from the big African predators (like lions), who were happy that these silly primates decided to abandon the inaccessible (for them) trees and come closer to them. Continuing loud singing in such a situation, in the kingdom of the lions, and far from the safe trees, seemed like the surest way to a genocidal suicide.

But the big difference was that our ancestors were **singing in groups**. First of all, even just being in groups gives the group members a safety-in-numbers benefit (Hamilton, 1971; Rendall et al., 2000). Besides, if the group members shout together at the attacker, this can have quite a helpful effect for the intended prey. You do not need to see too many horror movies to realise that, confronted by sudden mortal danger, humans usually scream. If you think that this is a fruitless wasting of energy in the face of a danger; think again. Loud screaming and shouting in a situation of sudden mortal danger seems to be an evolutionary strategy for our survival, and it has a double effect: (1) an audio-attack on an aggressor and (2) a call for help. Many lives were saved by screaming both in the jungles and in the night streets of cities. Interestingly, loud screaming is not an evolutionary strategy for all species – some do not make any noise even when terribly wounded in a violent attack (like wolves), and some pretend they are already dead (capybara).

Screaming by a big group is more effective than individual screaming, and **well-organized loud noise** can stop even the king of the African savannah. We all know about the "beat" method of hunting when the loud shouting and noise of an unarmed human group can scare and direct large and strong animals towards the intended spot, push them over a cliff, or just drive them out of the proximity of human territory. Even today, if a stray lion comes close to an African village, group shouting is the first means of shooing it away.

Despite the immense importance of safety issues in our contemporary western society (where safety standards are the highest in human history), this issue has not been adequately investigated in relation to our distant ancestors (where safety was at the lowest possible level). "Although predation has long been thought to explain the

evolution of alarm calls (e.g. Maynard-Smith, 1965) the effect of predation on the evolution of other call types has not been well investigated" (Uster & Zuberbuhler, 2001:742). What I am going to do next is to talk in more detail about the evolution of the "other call type", connected to strategies for safety from predation.

When our ancestors were colonizing the ground, searching for food, or mastering their first stone tools, they could not do this is the safety of well-protected houses, shops and workshops. Any moment of the day they were vulnerable to fatal attacks by big predators. These times are now gone for good, and are apparently forgotten. This must be reason why, although food-searching, hunting and sexual behavior and strategies of hominids and early humans had been among the favorite topics of countless publications, the surviving strategies of our ancestors have not received sufficient attention. At the same time studies of primates show that they spend more time in scanning for predators than in searching for food.

Any tree-dwelling primate is in mortal danger while staying on a ground for some time. They can more easily become prey on the ground. So, as soon as primates notice predators, they rush back into the trees. Our ancestors were in a highly vulnerable situation on the African ground after they moved there. Trees were not around in a moment of danger, and they were not good runners like antelopes, able to outrun predators. Group defence seems to be the only viable option our grandmothers and grandfathers had about some 200 000 generations ago.

Talking about safety measures of our distant relatives, particularly interesting and important in this context is the notion of "well-organized loud noise" I mentioned above. Let us remember what I said a couple of pages ago: although creating elaborate melodies and singing long songs is not only a human prerogative (as I have already mentioned, whales and avian birds can beat us at melodic inventiveness), **group singing with a precise rhythmic pattern, uniting all participants, is a characteristic of human behavior.**

So, I am suggesting that **"rhythmically well-organized loud noise", or the predecessor of human choral singing, was initially established as a safety measure against the big ground predators of the African savannah.**

Safety measures against predation were crucially important for early humans. Unlike us, our ancestors were not "on the top of the food chain", and they had to take very strict measures to survive. Of course, they needed time to stay together as a social group and groom each other, they needed time to find and share food and raise a new generation, but first and foremost they needed vigilance and the right strategy to survive, particularly after they descended from the relatively safe tree branches and started their painful "long and winding road" leading to humanity.

Contemporary studies of monkeys and primates, not conducted in the natural environment, cannot inform us about the crucial importance of the safety measures, but studies conducted in the wild are clear about the paramount importance of strict safety measures. According to Bshary & Noe, Diana monkeys spend a large proportion of their time scanning for predators (Bshary & Noe, 1997; cited from Uster & Zuberbuhler, 2001:754). Vigilance can be shared across the species as well.

According to Wickler, "in some species of babblers, one member of the group remains perched above the ground with the rest of the group feeding below. After some time, the individual is replaced by another group member who will take over the role as the sentinel. Coordination of vigilance is regulated acoustically: about every five seconds the sentinel produces a low-pitched, short range, and difficult to locate call, the watchman's song, which informs others that the individual is watchful and that nothing has happened" (Wickler, 1985; cited from Uster and Zuberbuhler, 2001:754).

It is not difficult to appreciate the rigorous safety measures that most animals use to avoid predators. We all can agree, I hope, that it is much more important not to make mistakes in searching for predators than in searching for food. Of course, it might be frustrating if you have not noticed a good stack of bananas, but if you have not noticed a crouching lion, well, you may never need a banana any more. Besides, most of the animals (including our ancestors) needed food only when they wanted to eat, but they were under the threat of being eaten any moment of the day. That's why most animals look for food for some time of the day, but vigilance against predators is needed all day round.

It has been already mentioned above that scholars have not paid sufficient attention to the effects of predation on the evolution of other than alarm calls, although the crucial importance of safety issues for humans is very well known to all of us. Even today, when we can enjoy unimaginably high standards of safety and longevity (at least in the western world), safety is still the number one priority. We all know that safety concerns are possibly the only real reasons that could make us deliberately give up part of our personal liberties.

Let's go back to our ancestors trying to secure themselves from the lion's claws. As I have already mentioned, I believe that the rhythmic component of human group singing was achieved after the human ancestors descended from the trees. I have a few points to back up this idea:

- Kortlandt wrote about the loud display of vocalizations, accompanied by foot-stamping and drumming on tree trunks made by chimpanzee bands as a possible means to scare away predators and competitors, and also suggested that Australopithecines "probably sang and drummed" (Kortlandt, 1973:14). The noise of chimpanzee bands is **not organized in a strict rhythmic unity** for every member of the band.

- Descended from the trees to the ground, our ancestors found a very effective new component for their "audio defence" – **stomping on the firm ground**. Even today when we want to scare away something or someone, we often **instinctively stomp on a ground** together with a loud sound and hand gesture. I suggest that this widely spread (and possibly universal for all human societies) behavior is connected to the ancient safety strategy against the major predators of Africa.

- There must be something impressive and imposing in the stomping sound itself. Possibly because we all instinctively know that only very large animals can

create stomping sounds (the classic scene from "Jurassic Park" of T-Rex's distant stomping making water fizzle comes to mind).

• If someone thinks that there is hardly any difference for a marauding predator between the loud and unorganized noise, made by a large group of intended prey, and the loud and rhythmically well-organized sound, think again. The difference is absolutely huge. The loud but unorganized sound, although it can still make a predator hesitate, sounds more like an audio nuisance from panic-stricken prey, but the organized rhythmic sound gives a strong message of well-organized and united resistance. Readers might know from recent history how strong the impact of mass choral singing of "songs of protest" was in the fight against South African apartheid.

• Attacks by lions, tigers and other big cats usually take a split second. Prey usually does not even see the attacker, as big cats prefer to attack when the prey is not looking in their direction (that's why cheap plastic masks with human faces, fixed from behind on the head, saved many lives from man-eating tigers in the Sundarbans national park in India and the Bangladesh swamps. See Jackson, 2003:78-80). Of course, during the split second of the attack there is no time to organize a loud and stomping choir to scare the attacker. I suggest that the loud stomping singing-shouting choir would be employed only when the predator was spotted before the attack (and with many eyes this was easier to do). I suggest that with no good trees around, and without very fast legs, the only defence for our ancestors in the face of danger would be to unite as a group in an organized display of unity, stand their ground and scare off the attacker with loud shouting and stomping.

• Of course, if the loud sound was only a sound, without any other "materialistic additions", lions would have soon realized that there was not much to be afraid of, but most likely, this loud and well-organized sound was accompanied by the throwing of more materialistic objects (stones, rocks, branches). The suggestion of the evolutionary importance of precise throwing proves very useful in this situation (See Calvin, 1982, 1983, 1993). Therefore, it must have been a combination of both factors that would turn away hungry lions from non-running groups of stomping and throwing primates, and to go after more "prey-like", although faster running, four-legged preys.

• Calvin's suggestion of the evolutionary importance of object throwing as a means of **hunting** does not pay much attention to object throwing as a **defensive** function for our hominid ancestors. Throwing could serve the function not only of reaching a quicker running prey, but also of keeping a predator far from undesirable physical contact with a hominid body. Defence throwing is well known among chimpanzees, trying to "intimidate leopards, snakes, and fellow chimpanzees" (Calvin, 1993:241). Although Calvin himself suggests that "music ought to have so little feedback on natural selection" (Calvin, 1993:240), I suggest that the rhythmically well organized loud stomping group defence, coupled with throwing objects at predators was the main surviving strategy for early hominids.

• Some individual members of the group, as in every society, would be braver, and others could be more panic-stricken, particularly when facing a predator like a

hungry lion. And here comes another function of the "lion dance": **relentless repetitive rhythm in a dramatic climax of standing your ground for your life against the lion must have had some kind of hypnotic effect on the whole group of stomping primates. This rhythm would unite everyone against the common mortal enemy, giving every member of the group the feel of communal safety.**

• If some members of the group were still overtaken by fear and tried to outrun the lion, well, most likely would become the prey. (By the way, experts suggest, that if you are ever attacked by a lion or a tiger, do not run away! This is not the easiest advice to follow in a situation like this, I agree, but they say it helps). So, the lions were themselves eliminating faint-hearted members of the pre-human groups who "did not want to join the choir". Therefore predators were inadvertently helping human ancestors to be more united in a relentless rhythm of the "lion dance".

• Human ancestors shared the ground and living space with African lions for at least a couple of million years. Imagine the choir where all the individual members are forced (literally under the fear of death!) to be in perfect unity with the other members of the choir. And imagine the "rehearsals" of this choir occurred almost every day, and continued without stopping for any holidays or school breaks from one generation to another. And another. And another. For more than a million years. And all these millions of years the rehearsals continue under the watchful eyes of hungry lions, and the prize for good synchronous singing is life. I do conduct a couple of choirs. We usually rehearse once a week, trying to get a harmonic and rhythmic unity, and sometimes it is not easy for me to gain everyone's attention… Well, no more dreaming… I guess, if we could hear the "choir" of our hominid ancestors, the resulting rhythmic (and melodic) precision of our ancestors by the time they mastered stone tools and were ready to move out of Africa, must have been astounding.

• I suggest that **the origins of the hypnotic drive of humans to follow the rhythmic pattern of the music with stomping, finger clicking, singing alone or just a rhythmic movement of any part of our body comes from these millions of years of relentless "rehearsals" of our ancestors under the threat of death.**

• It is a great feeling when a group of relatively weak creatures can shoo away a big and strong predator like a lion, and it does not take much speculation to imagine that our ancestors would soon transform their effective "lion dance" into a ritual dance.

• Therefore, I am suggesting that our distant ancestors used rhythmically precise organized group singing and dancing (initially more of a shouting and stomping) as a survival strategy against predators after they descended from the trees. Although tuneful "family" singing must have been a part of their everyday lives in the trees (like among gibbons today), the relentless rhythmic organization of human singing and dancing must be connected to the ancient hypnotic "lion dance".

• William McNeill, American historian from the University of Chicago, the author of the bestseller "The Rise of the West: A History of the Human Community", published an insightful book "Keeping Together in Time: Dance and Drill in Human

History", where he gives ample examples of the different human activities when large group of humans find it easy and even exciting to move and do physically demanding exercises, if their movements are precisely rhythmically unified (McNeill, 1995). The powerful influence of long army drill in achieving psychological unity and obedience of the new recruits is also well known to army generals (McNeill, 1995).

- The evolutionary psychologist Robin Dunbar proposed that group music-making leads to endorphin surges within the brains of the participants, resulting in their feeling happy and well disposed towards each other (from the 2004 presentation at the conference "Music, Language and Human Evolution". Cited from Mithen, 2005:208-209, note #6 on page 322). "Did you have fun?" was the question usually asked of participants in collective working on the maize fields in western Georgia, working that was always accompanied by the singing of special *Naduri* songs (Tsuladze, 1971:21). Carl Bucher gives plenty of examples of the magic power of united rhythmic singing for making the process of hard work easier (Bucher, 1923 [1919]) .

- Large groups of chimpanzees sometimes conduct an awe-inspiring performance including vocalizations and other stamping and drumming sounds. What is also very interesting is that they often organize this kind of "concert" at dusk, before going to sleep. A precise rhythmically organized and intimidating "lion dance" could have been used routinely by our hominid ancestors in the evenings to scare away the night predators. It has been noticed, that "African natives who live in the bush do much the same at nightfall organizing a loud sound display" (Kortlandt, 1973:14). Scholars sometimes portray our ancestors singing at their camp of an evening (Livingstone, 1973; Mithen, 2005). Singing and drumming for safety during the night gives another meaning to these idyllic evening "concerts". Loud singing and rhythmic stomping could fulfill evolutionarily very important safety function.

- This is not the whole story. I suggest that defence was not the only function of the loud and intimidating "lion dance". Would a group of hominids use the powerful audio display not only for defence, but for attack and intimidation as well? I mean would they, for example, try to chase away a lion (or even lions) from the lion's kill? We should not be too skeptical about this "crazy bravery" of our ancestors. It is documented that an unarmed and shouting group of humans can chase away the hungry man-eating tiger from its kill. Hunter and conservationist, my childhood hero Jim Corbett gives a few such examples in his documentary books about man-eating tigers (Corbett, 1946). Therefore, the possibility of big group of hominids intimidating lions with the rhythmic "lion dance" seems quite possible. At least, in the desperate situation of being without food for the group for several days hominids could have been pushed to organize such an attack. I can easily visualize how the starving hominids would watch lions hunting, then they would give the lions some time to feed (if they did not want to deal with *very hungry* lions) and then they could start their rhythmic attack for their share of the remaining carcass. "Tell me how hungry you are and I can tell you what you could do". The near proximity of death from starvation can radically alter human behavior. Educated and civilized humans were pushed to massed cannibalism in Leningrad by total starvation during the Second World War,

when Stalin categorically refused to give up the city of Lenin to the Nazis. I remember meeting a distant relative from Leningrad in the first half of the 1980s, and remember my shock when on my simple question "Do you have a grandmother?" she simply answered "No. She was eaten by her neighbors in Leningrad".

- As a matter of fact, this kind of "aggressive scavenging" (or "confrontational scavenging", according to Robert Blumenschine, 1986) behavior could be the main source of obtaining meat for our hominid ancestors. It would not be too far-fetched to hypothesize that even a very few successful attempts by starving hominids to drive away lions from the remainder of the kill would be enough for smart hominids to realize the "attacking power" of the "lion dance", and to encourage them to use this strategy to obtain meat in other cases as well, not only in cases of absolutely extreme starvation.

- Binford suggested that scavenging was the main strategy for our distant ancestors to obtain the much-needed meat (Binford, 1985). The "hunting versus scavenging" discussion already has a long tradition. My suggestion of "aggressive scavenging" changes the nature of scavenging, because killing a rabbit or antelope is not more difficult than chasing lions away from their kill. By the way, lions themselves are well known to use intimidation to shoo away smaller predators and to scavenge their kill. So my model supports Binford's very interesting suggestion.

- Another potentially very interesting line of research that I am not going to follow in this book is the obvious link between the **stomping behavior** of our ancestors and hominid **bipedalism** that started in the African savannah. It is not difficult to imagine that hundreds of thousands and even millions of years of vigorous stomping could help to transform the somewhat awkward "lower hands", which were better prepared to climb trees, into the flat organs that were well adjusted to carry our ancestors for many kilometres each day, and also to make good stomping sounds to secure their families from predators and even obtain a food.

- The killing of human ancestors by lions and other predators of Africa must have still not been very rare, no question about that. Caught off guard, or alone, our ancestors were not a match for the lion's fangs and claws. But together these hominid groups were a force to be reckoned with even for a hungry lion. Hundreds of thousands and millions of years passed in this evolutionary struggle for survival in the African savannah, shaping our sense of unity and rhythm.

- Zygmunt Estreicher made a much-cited comparison about the "in-built metronome" in the heads of African musicians in his remarkable study of rhythms among the Bororo tribes (Estreicher, 1964). A sense of rhythm is one of the musical universals that unite the human race, and it is interesting that it seems to be particularly precise among sub-Saharan African populations. Pygmies are hailed as the best drummers and dancers by sub-Saharan Africans themselves (see the discussion of Pygmy polyphony in the first part of this book), so the undersized populations of Central African rainforests arguably have the strongest sense of rhythm among the human populations of our planet.

• Drumming and drums are usually (and most likely correctly) identified as the first type of musical instrument humans used in the course of their musical evolution (after the most natural instrument – their own voice). There is something deep and symbolic in this suggestion that the first drum our hominid ancestors used was the earth itself, and the first drumming (stomping) started as a means of group unification and group defence against the large African predators that humans faced on the ground.

• We should not discount the possibility that the first human-made musical instruments (arguably drums) were initially made and used as a very effective means of making a louder noise to increase the safety of the night camp.

• If we have a look at the characteristics of the musical culture of sub-Saharan Africans, arguably the best-preserved polyphonic tradition of our planet, and at our hypothetical reconstruction of "primordial polyphony" (see above), we can see that (1) they both have a 4/4 rhythmic basis (ideal for stomping), (2) they both are almost always connected to vigorous movements, (3) stomping is often one of the main elements of their dances (4) singing is often loud, and (5) the melodic phrases are often very short, consisting of precisely coordinated two-three-sound energetic phrases. All of the mentioned characteristics fit very well the requirements for the "lion dance" of our hominid ancestors.

• This long struggle for survival and safety measures must have been a powerful drive for our ancestors to live in **bigger groups.** Bigger groups meant not only more eyes to see the predators and more fighters, but more singers, louder stamping and a generally louder sound for the "lion dance".

• Scholars suggest that the bigger size of hominid groups must have been one of the most important factors leading to the development of more complex social interactions and the increase of human mental capacities (Aiello & Dunbar 1993; Dunbar, 1996; Byrne & Whiten, 1988, 1992).

• The same long struggle for survival against African predators could have been one of the key factors in the **gradual increase of the body size** of the individual members of the group as well. If life on tree branches favored smaller and lighter individuals (who could easily move through the trees and could escape leopard-like predators on higher branches), moving down to the ground, where unlike the tree branches, different "weight categories" live side by side on the same level, favored bigger individuals who could not only shout louder, but were physically stronger as well.

• And finally, I would like to propose that the origin of human rhythm might provide an evolutionarily background for future human language, as a pulsating and flowing rhythm must have prepared the appearance of both human music and language. Neurologically this suggestion makes good sense, as human rhythm is mostly located in our left hemisphere, and in the light of the very early origins of rhythm, it could have played an instrumental role in transforming the primate ancestor of the Broca structure into a human neurological basis for the human language.

So, according to the suggested model, after our ancestors descended from the trees, there were a few simple alternatives for them to follow:

(1) To stop "irresponsible" singing, grow bigger teeth and learn fast running for their lives;

(2) To go back to the safe tree branches, and

(3) To create bigger size groups and defend themselves as a group.

According to the evolutionary results, human ancestors did not stop singing, did not grow bigger teeth, did not become great runners to outrun lions, and did not go back to the trees. We will never know the number of failed attempts in pursuing any of these options during the millions of years of evolution, but according to the final result, those who opted for closer contacts between the group members, increasing the group size, cooperation and more effective means of group defence, were favored by evolution. The rest, as they say, is history.

Singing in Peaceful Times: Towards the Origins of Human Language

Singing definitely had other that defence (and attacking) functions among our hominid ancestors. In the first place, hominids were able to design a unique new "lion dance" because most likely singing (even group singing) was a part of their everyday life amongst the tree branches. The big change to their group singing style after they descended from the trees was the unstoppable rhythm, initiated by the group stomping.

The newly found exciting hypnotic element – rhythm - must have soon entered the other side of the hominids' singing life. I have already mentioned that the "lion dance" was most likely soon transformed into a ritual context, when a lion was not around, as the celebration of a victory over a powerful enemy. This feature of celebrating a big victory with group rhythmic chanting is still a large part of human culture. As I am writing these words, the 2006 World Cup just started in Germany. We do not know the winner yet, but we can be sure that the mass rhythmic chanting and dancing will follow the win of the cup on the 9th of July in the winning country. I remember myself chanting rhythmically together with hundreds of thousands of happy Georgians who were spontaneously celebrating on the streets almost the whole night after our Georgian football team Dynamo Tbilisi won the European Cup Owner's Cup on May 13th 1981. A great feeling.

Joseph Jordania (2006). From the Book: WHO ASKED THE FIRST QUESTION? The origins of human choral singing, Intelligence, Language and Speech. Logos Publishing.

Group rhythmic singing and dancing must have been a powerful means of human group unity, and the combined strength provided assurance, no question about that, but in this section we are interested in other functions of hominid singing. Uniting big groups is something that singing is very good at, but singing in the animal kingdom (and among our ancestors) had a less "adrenalin-fuelled" function as well. I am talking about the function of everyday communication.

Music as communication is as old a topic of scholarly discussions as the origin of music or language. Despite the assertion of one of the most recent publications on the origins of music, "Singing Neanderthal" (Mithen, 2005:2), that works about the origins of music are non-existent with the exception of a few pages in Darwin's 1871 book, a 1973 book by John Blacking and a few other contributions in recent years (including a recent collection of articles "The Origins of Music" - Wallin et al., 2000), plenty of scholars approached the problem of the origins of music in different times and in different languages. Here are some of the authors and ideas on this topic in rough chronological order:

- Jean-Jacques Rousseau was possibly the first scholar after the 1700s who wrote about the origins of music. According to his views, both music and speech had a common ancestor. This initial human communication was based mostly on singing, and it was more passionate and emotion-driven than contemporary human language (Rousseau, 1761).

- Herbert Spencer suggested in the middle of the 19th century that music evolved from the exaggerated emotional speech of our ancestors, or, in other words, from the prosodic elements of human speech (Spencer, 1857).

- Charles Darwin, in "Descent of Man", suggested that music predated the origin of language and served the needs of sexual selection and charming the opposite sex (Darwin, 1971).

- Karl Stumpf suggested that music came into existence as a means of long-distance communication between the early humans (Stumpf, 1911).

- Richard Wallaschek suggested that both music and speech originated from the shared primitive stage of communication, and music came from primordial "dance-play" (Wallaschek, 1891).

- Otto Jespersen hypothesized in 1895 that language must have begun with "half-musical unanalyzed expressions for individual beings and events"(Jespersen, 1983:365).

- Ernst Newman proposed that the origin of music was independent of speech, and that humans had the ability to express their emotions through music much earlier than they developed speech (Newman, 1905).

- Karl Bucher stressed the important links between human music and rhythmic movements and suggested that music developed out of work-related rhythmic movements (Bucher, 1919).

• Boris Yavorsky introduced the idea of "intonatsia" [intonation] as a smallest and oldest element of musical language, dominating Russian musicology throughout the 20th century and fundamentally influencing Boris Asafiev's view on the essence and development of musical culture. Yavorsky suggested that intonation was the earliest form of human language (Yavorsky, 1923).

• Siegfried Nadel proposed that music originated as a supernatural language, used in religion and ritual, and that musical language was added to the everyday speech through artistic expression (Nadel, 1930).

• Curt Sachs rejected all theories of the origins of music as improvable or wrong, although in his own earlier writings he suggested that music could have originated from two sources: (1) speech and (2) emotions (Sachs, 1943, 1962).

• Boris Asafiev also suggested that music and language had a common ancestor that was later separated during the course of human evolution into two related but sometimes conflicting phenomena (Asafiev, 1971).

• Bruno Nettl wrote in one of his early works that both music and language were born out of a common ancestor, a specific system of communication that shared elements of both music and language (Nettl, 1956). In his later article, written for the MIT 2000 volume "The Origins of Music" Nettl discussed musical universals (Nettl, 2000)

• John Blacking considered music as a purely human creation, inseparable from social context and primarily serving the needs of social cohesion in human groups (Blacking, 1973). His definition of music as "humanly organized sound" is contradictory, as it excludes the possibility of the presence of elements of music in the animal kingdom (for example, the singing of humpback whales), and awkwardly implies that human speech is part of music as well.

• Frank Livingstone suggested that our human ancestors as far back as the Australopithecines were communicating by singing (Livingstone, 1973), although later he changed his view and linked the origins of singing to the period of tool-making technologies (Livingstone, 1983).

• Roger Wescott suggested that the earliest predecessor of human language among Australopithecines was pitch-based, but non-vocal whistling, combined with some other non-vocal sounds like "hand clapping, foot stamping, and drumming on their chests or on external objects" (Wescott, 1973:27, also 1971).

• Miron Kharlap considered the origins of music within a 'Spencerian' model, with singing growing out of the prosodic elements of human speech. Most importantly for the topic of this book, Kharlap suggested that the historical development of human musical culture went not from monophony to polyphony, as it was universally believed by music historians, but from polyphony to monophony, from group to individual musical activity and talked in this context about the origins of monophony from polyphony (Kharlap, 1973). We will specifically discuss the importance of this idea later in the book.

- Ivan Fonagy suggested that our ancestors' language was musical and the pitch modulations carried the meaning of communication directly. Speech evolved later as a more complex system to express more complex ideas more efficiently (Fonagy, 1981).

- Juan Roederer specially looked for the survival value of music and suggested that music was developed to play the role of a device to assist the human brain in acquiring language (Roederer, 1984).

- Izaly Zemtsovsky in his publications stressed the importance of intonation in the development of initial forms of human musical activity (Zemtsovsky, 1986) and the crucial importance of dialogical forms of communication for the origins and the initial forms of group singing (Zemtsovsky, 1986, 1986a). Zemtsovsky and three following authors were participants in the special conference dedicated to the genesis and specificity of early forms of musical culture held in Dilijan, Armenia in 1986.

- Viacheslav Ivanov suggested that the presence of "personal songs" for each member of society in different cultures might indicate this was the oldest form of personal "naming". He also stressed the importance of the neurological aspect of musical activity, suggesting that music could play a crucial role in memorizing important texts in early human history (before the advent of a system of writing. Ivanov, 1986).

- Boris Frolov and A. Demirkhanian stressed the crucial importance of rhythm in the initial stages of the development of human musical and social activities (Demirkhanian, Frolov, 1986. See also Frolov, 1986).

- Joseph Jordania, the author of this book, in his first publications on this topic suggested distinguishing musical *language* and musical *culture* and argued that the division of human cultures into polyphonic and monophonic groups must have started during the early stages of human evolution (Jordania, 1986a, see also his later works, including this book).

- James Brown and William Greenhood noted the evolutionary primacy of musical communication and suggested that the melodic utterances of *Homo erectus* changed into staccato-like speech with long utterances at the *homo sapiens* stage (Brown & Greenhood, 1991).

- Nils Wallin researched the biological foundations of human musical abilities, based on a multidisciplinary approach to the human brain, physiology, auditory and vocal systems (Wallin, 1991). Together with Bjorn Merker and Steven Brown Wallin he organized a cross-cultural conference on the origins of music in 1997 (see Wallin et al., 2000).

- Bryan Levman provided a good review of the existing theories of music origins. He suggested that both speech and music must have had a common ancestor, and argued that pitch modulations played a crucial role in the human proto-language (Levman, 1992).

- Bruce Richman suggested that initial choral singing could have been a crucial element in the development of a more complex communication system – human language (Richman, 1993).

- Steven Pinker actually dismisses the role of music in the evolution of human communication as a late phenomenon, mostly a by-product of language development, and as a result of several evolutionary factors: development of language, auditory scene analyses, emotional calls, habitat selection and motor control (Pinker, 1997).

- Bjorn Merker suggested that music could have originated among hominids as a group activity and initially had the function of a mating call for groups of competing males, inviting wandering females (Merker, 2000).

- Steven Brown suggested the model of "contagious heterophony" for the origins of music. According to this model, group-singing behavior was at the very beginnings of music, and the mirror neurons played a key role in this process (Brown, 2003). In his earlier work Brown suggested the idea of "musilanguage", a common sung predecessor of music and language (Brown, 2000).

- William Benzon wrote about the particular importance of shared music creativity from the perspective of a jazz musician, and argued "music is a medium through which individual brains are coupled together in shared activity (Benzon, 2001:23).

- Robin Dunbar also suggested that the evolution of human language went through a musical phase (Dunbar, 2004).

- Steven Mithen suggested that music and language co-evolved during human evolution as non-referential (music) and referential (language) systems of communication. He suggested a model of the origin of music from the "Hmmmm communication" (combination of "Holistic, multi-modal, manipulative, and musical" features), and noted that prelinguistic hominids may have had better musical abilities than modern humans (Mithen, 2005).

This list is by no means complete, but I hope it gives the reader a general idea of the range of scholars and their ideas about the importance of a musical component (vocalization and singing) in the development of human language. Of course, there are plenty of differences between the suggestions of different scholars. Some scholars write about "singing", others about "vocalizations", and some about "vocal calls", but the general idea that vocal communication was crucial for language development is clear in most of these suggestions.

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Gestural Theory of Language Origins

The only serious alternative that has been suggested for the development of human language is the so-called "gestural" theory of language origin (see Hewes, 1973, 1977; Armstrong et al, 1995). According to the proponents of this theory, the evolution of human language went through a gestural phase. Suggested first by Condillac in 1746, this theory was particularly influential in the 1970s and the 1980s with the remarkable success achieved in teaching apes sign language.

Gestural theory had many attractive sides:

(1) First of all, it was believed that apes (our closest relatives) 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.

(2) Another important point for the support of gestural theory was the lateralization of musical abilities and human language in different 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 our closest living relatives the American Sign Language. Apes, constrained from talking due to their physical inability to produce a wide range of articulated sounds, suddenly started communicating with the experimenters (Gardner & Gardner, 1969; Premack, 1970), answering their questions, following their directions, 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.

The subtle decline in the influence of the gestural theory in recent years was mostly connected to advances in our understanding of the character of animal vocalizations and the lateralization of language and musical faculties in our brains.

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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. The suggestion that our living relatives could have had at least partial control over their vocalizations started with Steklis' 1985 publication, and many followed. Barbara King wrote in 1994: "…the ability of some monkeys to produce voluntary vocalizations is ignored when hominid vocal communication is discussed. Although no evidence exists either for or against voluntary vocal production in chimpanzees, it is known that some monkeys do produce calls voluntarily. Why, then, should the monkey evidence not be used to consider the possibility that early hominids were capable of referential vocal production?" (King, 1994:109). In the last few years Kanzi, a bonobo that provided some of the most remarkable examples of the 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 some distortions (Greenspan & Shanker, 2004:163).

The localization of musical abilities in the right hemisphere and of language (and speech) in the left hemisphere was another major obstacle for acceptance of the vocal theory. A closer look revealed that the seemingly simple dichotomy "music is in right hemisphere, and language is in left hemisphere" is not so simple. When music signals are **learned** from early childhood, they are localized in the left hemisphere:

- 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 (Nottebohm, 1971, 1972; Bright, 1984; Bradshaw & Rogers, 1993).

- 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 (Henson, 1985).

- The pitch-based element (intonation) of tone languages is acquired (learned) in early childhood, long before the acquisition of articulated sounds of speech (Kessen et al. 1979:98-99; Clumeck, 1980:259-265; Moskowitz, 1991:148). As a result the system of tones of tone languages is also localized in the left hemisphere (Gandour et al. 1988). Thus, musical activities, which are transmitted culturally (learned) during the individual's early development, are localized in the left hemisphere in both animals and humans.

- Despite the fact that study of lesions (brain damage cases) are pointing to the localization of music and language in different parts of the brain, studies based on brain-imaging methods (or a 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. One of the biggest authorities

in this sphere, Isabelle Peretz, wrote "In my view, the only consensus that has been reached today about the cerebral organization underlying music concerns pitch contour processing. The vast majority of studies point to the superior temporal gyrus and frontal regions of the right side of the brain as the responsible areas for processing pitch contour information. However, it remains to be determined if this mechanism is music-specific, since the intonation patterns for speech seem to recruit similarly located, if not identical, brain circuitries" (Peretz, 2003. Cited from Mithen, 2005:65).

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 higher language to another species is evolutionally artificial. Our ancestors had not been taught a higher language by someone else. They developed higher language themselves simultaneously with the development of their cognitive abilities and gaining cortical control over their vocalizations.

Advantages of the vocal medium over gestures 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), relatively short distance between transmitter and receiver, and frontal orientation. Making manual gestures is slower than speaking, requires more energy, and prevents 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 later change of 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 almost the same long list of advantages over the manual gestures are characteristic not only for contemporary speech, but for an archaic vocal communication as well (see also Carstairs-McCarthy, 199:103-4)?

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Pitch-Based Language: Singing, Whistling, Drumming

Although human **language** and **speech** today seems inseparable, scholars generally agree that they are essentially and chronologically very different phenomena. Language could have existed long before the emergence of speech. Despite this general agreement, not every scholar makes a clear distinction between language and speech, which is why experts often complain that it is not clear whether some authors make any distinction between these two phenomena.

I want to stress from the very beginning that **the difference between language and speech is absolutely crucial for the suggested model**. I fully agree with the big group of scholars who hold that language must have existed long before the emergence of articulated speech (for example, Krantz, 1980; Byrne, 1995:148-49; Armstrong et al. 1995). Therefore, we will first discuss the origins of language from the musical point of view. We will discus the problem of the emergence of speech much later, in the context of the uneven distribution of polyphonic singing traditions in different human populations all around the world.

The origin of language in human evolution was a crucial point in becoming a *Homo sapiens*, or a thinking primate, or if you prefer, a human. As Grover Krantz pointed out in his commentary on Livingstone's article about the singing Australopithecine, the crucial element of language is the "neurological capacity for symbolic thought, the ability to form mental images of things not being perceived. It is only of secondary importance just how these thoughts are communicated" (Krantz, 1973:26).

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 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 the speech. Speech is just one of the **mediums** of language, although by far the most economical, fast and universally employed one in all human societies. Historically speech was almost exclusively the only medium for human language, as other mediums of language were mostly 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. Initially it was based on the signs that were used by mute and deaf individuals in the streets of Paris. The Morse coding system was developed in the 1830s by Samuel Morse and Alfred Vail. The system of the Marine Signal Flags was developed in 1855 in England by the British Board of Trade. Taking into account the overwhelmingly wider use of speech in human society and history, it is not accidental that sometimes scholars do not make any difference between "language" and "speech". For example, Dean Falk famously

declared: "speech *is* language" (Falk, 1980a:780, commentary to Krantz, 1980), a declaration with which at least some scholars would find it hard to agree.

Pitch language, based on pitch modulations, or musilanguage (the term of Steven Brown, 2000), seems to be the only alternative medium of language that can compete with speech in universality and chronological depths in human history. According to the range of dates that different scholars suggest, speech developed only within the last 40 000 – 300 000 years, which leaves a few million years of language development mostly based on pitch modulations among hominids and a series of archaic forms of *Homo sapiens*. But 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 difficult to find traces of the "past glory" of the pitch language.

Fortunately, there are some traces of pitch language in contemporary languages and societies. I am talking about the use of the system of pitch modulations, naturally employed in human communication. Here is a brief account of three of such instances when very precise ideas were communicated by means of pitch only:

• Whistle languages.

"Eusebio Martinez was observed one day standing in front of his hut, whistling to a man a considerable distance away. The man was passing on the trail below, going to market to sell a load of corn leaves which he was carrying. The man answered Eusebio's whistle with a whistle. The interchange was repeated several times with different whistles. Finally the man turned around, retracted his steps a short way and came up the footpath to Eusebio's hut. Without saying a word he dumped his load on the ground. Eusebio looked the load over, went into his hut, returned with some money, and paid the man his price. The man turned and left. Not a word had been spoken. They had talked, bargained over the price, and come to an agreement satisfactory to both parties – using only whistles as a medium of communication. (Cowan, 1948:280)."

Here is the "transcript" of the conversation that took place in the abovementioned "whistle 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" (G. M. Cowan, 1948:286)

This is quite extraordinary for us, but quite mundane for the mountaineers of the Mexican village of Mazateco. The Indians' story is a case of using a **whistle language**, or purely pitch language as part of normal everyday human communication. The same phenomenon can be encountered in a few other countries and regions of the world: in Brazil, Bolivia, Alaska, Nepal, Myanmar, 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 very interesting cases also where in a handful of isolated villages the whistle language is used in non-tone languages as well, as in Spanish, Turkic, or Greek villages (Busnel & Classe, 1976). Interestingly, West Africans sometimes whistle other, non-tone languages as well (for example, French). Of course, the "only pitch" communication severely constrains the content of messages that can be unambiguously transferred and received, but in evolutionary terms, even this relatively limited ability of precise information transfer via pitch-only medium could have crucial importance for the earlier stages of language development. Besides, it is important to remember that **speakers of tone languages never speak without the use of the tone element, whereas, as we can see, they can successfully communicate (and do this naturally in many parts of the world) with the use of the pitch element only, without the articulated component of language**.

As readers might remember, Roger Wescott even suggested that hominids initially communicated via whistling, instead of vocalizing (See Wescott, 1973). I do not think whistling would be so dominant over the vocal language at any point of hominid communication, but the use of a purely pitch-based whistle language in a few contemporary human societies is an important fact that should not be overlooked.

• "Language" of African drums

(or "African Talking Drums") is another instance of the use of a purely pitch component for communication. Unlike whistling, which could have been present in our distant hominid ancestors, the drum language of sub-Saharan Africans could be a relatively late (compared to singing of whistling) phenomenon. The use of musical instrument points to this. Despite this, 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 the earlier, already extinct words and expressions of the local languages (Crystal, 1987:401).

It is 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" which could further promote his idea of the importance of music (pitch-based communication) in the evolution of human language. The reason for this silence could be the following: 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" (Mithen, 2005:22), without even discussing the referential potential of pitch-based communication.

• Tone languages

also demonstrate the importance of the tone (pitch-based) component in human languages. If whistle and drum languages are present only in a limited number of regions of the world, tone languages constitute in fact the majority of world languages. We briefly discussed the nature of tone languages in the first part of this book in relation of sub-African parallel polyphony. The tone component is very important for both the morphology and the syntax. The lexical use of tone is widespread in all tone languages – in South-East Asian and African tone languages – and the grammatical use of tones, such as singular and plural forms and present and past tenses is "typical of many languages of Africa" (Cruttenden, 1986:9).

Speaking about the use of tone in languages, there is hardly a language in the world that does not make any use of tone and intonation. Even the speakers of English, a non-tone language, use different intonations to form interrogatives in statements in everyday speech (like the difference between "Let's go" and "Let's go?").

It is very important to note that 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. Here the pitch element assists articulation in conveying arbitrarily designed precise meanings**. An emotional element of tone is also present in tone languages, but it is **independent** of the lexical and grammatical meanings. So, regarding the use of tones in tone languages, we may say that pitch was 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 so-called "fully articulated language" came into existence, articulated speech did not fully replace the older pitch language. In some regions speech replaced the pitch language's lexical and grammatical functions. In other

regions the lexical and even grammatical functions of pitch language were preserved. This is the case in contemporary tone languages. Therefore it would be more appropriate to talk about the "partial replacement" of the ancient pitch languages. There is no language in the world that does not make use of tone (prosodic elements), and in tone languages many more instances of the referential use of the ancient pitch element are preserved.

Pitch language: The first Dead Language in Human History

The statement of Steven Pinker, that "even a plot as simple as 'Boy meets girl, boy loses girl' cannot be narrated by a sequence of tones in any musical idiom" does not tell us the whole truth. In the example of whistle and drum languages we can see that pitch contour can convey meaning precise enough to enable quite complex commercial agreements to made between two parties. Despite this possibility, today pitch-based language is used only as a marginal means of communication, mostly for communicating over big distances. Readers might remember Karl Stumpf's interest in pitch-based communication over long distances from the brief survey of different ideas on the origins of music earlier in this part of the book. This need in referential pitch communication was mostly lost after the much more efficient medium – speech - entered the scene, so unless we need to communicate over big distances in the mountains of Central America or the African savannah, we communicate with speech.

Our Australopithecine ancestors were roaming the African savanna during the longest period of our prehistory, when time was passing in millions of years. During this period our ancestors learned to survive without the safety of tree branches, sharing the ground with major African predators. We have already discussed the possible survival importance of loud singing and shouting displays, magnified by the precise rhythmic stomping of a whole collective of hominids. The impressive "lion dance", very effective for defence (and even attack to obtain carcasses), was more an ancestor of future human music than a language. The language of more "peaceful" everyday communication must have been quite different, although still mostly based on the pitch element (modulations of a fundamental frequency).

This early system of communication I will be mentioning with a term "pitch language". **Pitch language is a referential system of communication, based predominantly on pitch modulations** (See also Fonagy, 1981). Freedom from limbic control and cultural learning during the early years were its other characteristics. Increasing data about the freedom from limbic control of primate vocalizations suggest that both these features could have been present among our ancestors before the emergence of bipedal Australopithecines. At least at the stage of Australopithecine these features must have been present, because it is unlikely that hominids would actually **start** singing after they descended from the safe trees to the hazardous ground.

As a system of communication, pitch language shared common features with both primate calls and human speech. The features which link pitch language with primate calls were the presence of melodic contour (modulation of a fundamental frequency) as the main medium of communication, and possibly the presence of only a few consonants. On the other hand, liberation from limbic control and lateralization in the left hemisphere links hominid pitch language with human speech (or spoken language). So, by its form, pitch language was still connected with primate calls, but by its content pitch language was closer to speech. Thus, I agree with the idea of Bruce Richman, expressed in the title of his article "On the evolution of speech: singing in the middle term" (Richman, 1993).

Considering the importance of good musical abilities for our Australopithecine ancestors, I would suggest that their musical requirements must have been somehow close to those of contemporary professional musicians: (1) a good **musical ear** is essential for the physical survival of both of them; (2) intensive musical **learning from early childhood** is another important common feature, and (3) as the result of the previous point, in the brains of both the Australopithecine and the professional musician musical functions and extensive experiences are stored and processed by the **left hemisphere**.

The presence of a few consonant-like sounds in the primate call system heralded the future development of spoken language. You do not need to read Goodall or Stopa publications to notice that chimpanzees, Japanese macaques and some other primates do employ "kh" and "k" consonant-like sounds in their vocalizations. These consonant-like sounds have long since been recognized as a part of primate and ape vocalizations (Peterson, 1982; Snowdon, 1982; Stopa, 1979). Therefore, there are no grounds to deny the use of at least a few consonants in the mostly pitch-based communication of Australopithecines. It is interesting that contemporary speaking humanity is still using vocal communication based on these two elements: (1) consonants and (2) prosodic (pitch) elements, the same two elements that our not-so-close tree-living relatives still use in their communication.

An increase in the importance of consonants (as well as the appearance of more vowels) in the evolution of human communication resulted in the emergence of articulated speech. But before this revolutionary increase in the variety of vowels and consonants, our human ancestors must have communicated with the help of pitch contour predominantly.

There are a few other facts that point to the deep evolutionary roots of human musical abilities, and although I am not going to discuss them in detail, they deserve at least a mention:

- The g**enetic basis of human musicality** is widely known. This includes pitch perception, sound production, and the feel of rhythm. All three faculties have a genetic component. Readers may remember the example of Richard Wagner, who was among the most musically creative individuals in history, but could not sing in tune. Such facts suggest that seemingly interconnected different musical abilities are

in fact independent from each other. So not only "musical ability" is a separate ability, different from other mental abilities, but even **musical ability is in fact a group of independent musical abilities**.

- Another interesting fact that also points to a genetic component in the vocalizations of very young humans was provided by a study, conducted in my native Georgia. According to this study, the very first human vocalizations (cries of newly born infants) **audibly differ from each other in some interesting ways according to their ethnic origins** (Japaridze & Strelnikov, 1982).

- Very young children were found to have much better general musical abilities than adults. Perfect (or absolute) pitch enables a person to hear the actual pitch without its relative position to other pitches. **Having a perfect pitch is a norm among infants**, although among adults, even among professional musicians, it is very rare (Saffran, 2003; Saffran & Griepentrog, 2001).

Therefore, I think we should declare pitch language (or musilanguage) a dead language, arguably **the first dead language on our planet**. Pitch language prepared the basis and participated in the creation of speech, or in other words, pitch language "evolved" into a new, much more efficient articulated system of communication - speech. And in the same way, as we hear today plenty of elements of dead Sumerian and Latin in contemporary languages, the elements of the ancient "pitch language" are found widely in tone languages. The old suggestion that music grew out of the prosodic element of speech (suggested by several generations of scholars from Spencer to Pinker) gets the evolutionary sequence of communication development the wrong way around.

Pinker is correct, stating that every neurologically normal human can speak, but not everyone can sing and enjoy other musical activities (Pinker, 1997:529). But let us not forget that at least 40 000 (or maybe even 300 000) years separate us from the moment when articulated speech revolutionized human language. After this moment the system of arbitrary pitch signals was mostly forgotten, and only emotional intonation remained in our speech, as articulated sounds are not very good at expressing our emotions. And of course, in more than half of the contemporary languages, the old function of the referential and arbitrary use of the pitch element is part of our everyday speech in tone languages.

If we imagine the countless centuries and millennia that went into "forgetting" the ancient pitch language, it is a wonder that the majority of humanity still has enough musical ability to sing in a choir or play musical instruments. Another very interesting peculiarity of human musical abilities is that different human populations seems to have different predispositions towards music, and we will discuss this interesting issue later in this part of the book in the context of the uneven distribution of vocal polyphony on our planet.

Most of us, unless good users of whistle or drum languages, cannot narrate even the simplest plot using music today, but in exactly the same way hardly anyone

would understand if an expert in the ancient Sumerian language narrated a very simple plot in Sumerian. This is why these languages are "dead". On the other hand, the existence of the whistle and drum languages prove that the sequence of tones (based purely on pitch modulations) has a tremendous potential in expressing and transferring quite elaborate ideas.

Is Music an enigma?

At the very beginning of his discussion about human musicality Steven Pinker candidly declares, "music is an enigma" (Pinker, 1997:528). These words openly tell us about the problem many linguists have in dealing with the phenomenon of music. Most linguists prefer not to mention music in their writings about language evolution at all. Noam Chomsky arguably is the best-known representative of this huge group of linguists. As Mithen pointed out (Mithen, 2005:280), one of the most important recent publications on the evolution of language, written by a big group of the most renowned experts (see Christiansen & Kirby, 2003), fails to make any reference to music. This policy of most linguists of hiding their heads in the sand does not make the universal human phenomenon of music disappear from human society and communication. Pinker even goes on to declare that "Compared with language, vision, social reasoning, and physical know-how, music could vanish from our species and the rest of our lifestyle would be virtually unchanged" (Pinker, 1997:528). I am not so sure that "our lifestyle would be virtually unchanged" if music vanished from the human species, but I guess the life of some linguists, who work on the origins of language, would be much easier.

Some linguists do mention music in their writings, but mostly to dismiss its possible evolutionary role in the evolution of language. Steven Pinker is arguably the best representative of this, much smaller group of linguists. Pinker devoted eleven pages of his 600-plus page book to music. On these pages he does not try to discuss the possible role of music in language evolution, but discusses music as one of faculties that our brain deals with, and the discussion about music is sandwiched between discussions about brain reaction on watching paintings and going to movies. His dismissive comments about music as a "pure pleasure technology," with no evolutionary importance whatsoever ("as far as biological cause and effect are concerned, music is useless"), do not do justice to the millions of years of evolution of our ancestors before the advent of articulated speech.

Otto Jespersen's 1895 suggestion that musical pitch-based expressions played a major role in the initial stages of language development is a rare exception among linguists. Unfortunately, linguists of the following generations were too absorbed in the world of syntactic structure to notice the importance of non-articulated means of communication. Even the tone element of tone languages is mostly perceived by linguists as a late addition to spoken languages.

In this context Pinker's declaration "Music is an enigma" is very eloquent. Music will remain an enigma for linguists until they accept the idea that musical (pitch) communication could have been a crucial part of early language evolution. After the acknowledgment of the evolutionary role of a non-articulated, pitch-based channel for the early development of human language, linguists will have a clearer picture of the reasons why there are so many common features between language and music, why music and language activity involve the same brain structures of our brain, why we all want to tap, move our body or to sing along with our favorite songs, why participation in common rhythmic activity is so emotionally involving, why soldiers marching in exhausting drill feel uplifted and fight better, why the tone languages are such a mix of pitch and articulated elements, where the use of whistle and drum languages came from, and many other, often neglected but important topics.

Pinker is also correct in declaring that all neurologically normal humans have the ability to acquire complex language, but not every normal human can carry a tune. I did mention earlier that not only some "non-musical humans", but even great musicians (like Wagner) may have difficulty singing in tune. This fact of a relatively limited musicality in humans is not a confirmation of the later origin and the evolutionary uselessness of singing. It is much more likely that this fact is a result of the loss of the survival value of pitch control after the emergence of articulated speech for the last tens or hundreds of thousands of years. Mithen's suggestion that the Neanderthals had better musical abilities than contemporary humans (Mithen, 2005:245) is evolutionarily very sound and is supported by the many documented cases of the loss of the traditions of vocal polyphony in different regions of our planet. As a matter of fact, many animals (like rats, or avian birds) naturally have perfect pitch, rare even among professional musicians (Mithen, 2005:300). The fact of much wider wide presence of perfect pitch among very young infants also points to a gradual degradation of musical hearing during human evolution (ibid, 78-79).

This may sound strange to some readers, but we, humans, are gradually losing our musical abilities. On the other hand, this process of decreasing musical abilities occurs in parallel with the increasing sophistication of professionalism in music during the whole course of the evolution of human civilization and musical culture. When any of the treats common for the major part of the population becomes lost, there is a good chance that some individual members of the society will become experts in this vanishing area and will gain their living and social status in serving other members of society. This is the beginning of professionalism. Pygmies, possibly the most musical population of our planet today, do not have professional musicians in their societies.

Before the advent of articulated speech, pitch control was evolutionarily a very important trait and the everyday fight for survival must have favored individuals with a good sense of rhythm and good pitch control. After the great pre-articulated epoch of hominid and human communication came to an end, pitch control lost its survival value and started gradually deteriorating and vanishing from human populations. 40 000 years (at least) is quite a big period of time for any genetic trait to disappear when it falls out of "favor" regarding direct survival benefits.

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The fact that our musical abilities are still with us must be attributed to two main factors:

(1) First of all, the resilience of human musical abilities comes from the millions of years of active use and "genetic sharpening" through the selection of hominid and human musical abilities as the primary means of everyday communication and one of the central means of group cohesion and predatory control;

(2) Secondly, our musical abilities were survived by a few functions that could not be replaced by articulated speech. These functions include communal singing and dancing, emotional unity through following the same rhythm, and enjoyment of the hearing of musical sounds. These functions remained valid for the rest of our history, albeit gradually declining and becoming a field for professional musicians.

Therefore, when we try to find a "survival value" of music today, tens of thousands of years after the pitch language lost its direct communicational function, we are left with only a few functions that were not replaced by articulated speech.

Let us imagine we lost all the historical records about the crucial importance of horses in human history as one of the central means of transportation and an element of military power and we are only left with facts of the use of horses in contemporary western society. We could have come to the conclusion that horses were domesticated for the purposes of the enjoyment of outdoor life and weekend races. Luckily, there are plenty of records in human history about the revolutionary importance of the domestication of horses, such as mass migrations, the spread of Indo-European languages, human military history, etc. Anyway, horses were widely replaced by cars only about **one century** ago, and in some parts of our planet horses still play the leading role as a means of transportation (I remember this myself from the mountains of Georgia). Unlike horses, pitch language lost its function at least **four hundred centuries** ago, and no direct records survive from this period. In this situation it is not wise to disregard such important facts of human communication as the existence of tone languages where pitch plays an important role in the lexical and grammatical categories, or the existence of whistle and drum languages, where the complex messages are transmitted by means of pitch only. If we disregard these important facts, we will be doomed to regard music as an enigma only.

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Small Question for Noam Chomsky

Considering the origins of the human language, Chomsky (1957, 1986) suggested that language 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 hominid family and friends. Chomsky has been criticized for his almost creationist views on the origins of language and intelligence by fellow linguists (Pinker, 1997). His idea of a monstrous random genetic mutation was compared to a storm assembling a Boeing in the backyard. However, as genetic mutation is a random force, you cannot exclude (theoretically) the possibility that such a mutation could occur. I suggest a different approach to Chomsky's suggestion. I believe that even if we accept the idea of a monstrous genetic mutation, Chomsky's idea still cannot be evolutionarily correct.

So here is a question to Dr Chomsky and the linguists who consider Chomsky's suggestion of a monstrous genetic mutation a plausible idea:

Would a neurologically human child, born in a family of non-language primates (or hominids), be able to develop language faculties just from her/his genetic abilities, without any language speakers around in the early years of infancy?

I am not a child developmental psychologist, or a linguist, but according to what I have learned from published discourses on this subject, it seems to me that child development experts would unanimously agree that even a person with such extraordinary mental abilities as Dr Chomsky himself, would not be able to develop a normal human language if he was not surrounded by members of his own humanly speaking family.

Being born with all the necessary human genes, including human language and intelligence, does not guarantee anyone successfully using all these wired faculties. Every human child needs a human environment and humanly communicating adults to develop her or his genetically wired principles of "universal grammar" and human reasoning.

I fully agree with Steven Pinker's Darwinian approach towards the origins of language. 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.

* * *

Joseph Jordania (2006). From the Book: WHO ASKED THE FIRST QUESTION? The origins of human choral singing, Intelligence, Language and Speech. Logos Publishing.

So far we have discussed the possibility of the use of pitch as the main medium of early hominid communication. We are now going to discuss the central questions of this book, mentioned in its title: origins of human language and intelligence. I believe Mithen is correct in suggesting, "Not only does the origin of music reserve as much attention as that of language, but we should not treat one without the other" (Mithen, 2005:2). My suggestion is that not only must evolution of language and music be studied together, but that **the evolution of human musical abilities, intelligence, language, and speech are inseparable in human history.**

Has anybody asked a question? Language and Intelligence

On 27th August of 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. Three very nice young Hungarians, two boys and a girl about my age 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 s/he does not understand the language of the country s/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, Hungarian composer and pianist, Kalman Dobosh, taught me for such occasions. The young Hungarian looked at me even more surprised and still 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 for them I did not want to speak to them. I knew that Georgian speech was close to the strong Hungarian consonants, but I did not know that my host's fascination with my Hungarian pronunciation was so candid.

I remember wondering on 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. Of course, we may say that when we hear somebody telling us something, and then we notice that s/he is waiting for a reply, we can guess that this was a question. But this is often not the case with questions. I remember as soon as the question was pronounced, I *knew* this was a question without even understanding a word. I think 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 pitch element (rising intonation).

I think my fascination with the universality of question intonation started on that distant day almost 30 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.

Almost 20 years after that memorable meeting in the Hungarian café, in 1996 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. I could not believe the results of my search: I failed to find ***anything*** about the origins and evolution of the question phenomenon either in the literature connected with the emergence of language and speech, or in any special (linguistic, psychological, behavioral, sociological, philosophical) encyclopedic editions. A CD-Rom and Internet search also failed to provide me with any publication on the origins of the question phenomenon. It seemed that I was the first person "asking questions about questions". Of course, you can never be sure that despite all your efforts you have not missed an article of even a book on the subject you are interested in. But I can say that in all these ten years after 1996, if I see a new encyclopedia or a book on the origins of human language of intelligence, I routinely check at least the index for "questions", "interrogatives", and "asking questions". Still no results. Questions are so natural and so prevalent in every moment of our life and communication that we simply fail to notice them.

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

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Questions in Music: Musical Dialogue

On 10th of November 1986, at the opening of the second conference on traditional polyphony, held in the beautiful mountainous resort of Borjomi in Georgia, Izaly Zemtsovsky delivered a paper "Problems of Musical Dialogue: Antiphony and Diaphony". The paper was based on the fact of the extremely wide use of antiphonal singing in polyphonic cultures, and the idea was expressed that diaphony (this term is sometimes used for two-part singing), and hence the phenomenon of polyphony, had crucial connections to the phenomenon of dialogue in music. In my opinion this is one of the most productive ideas about the phenomenon of polyphony expressed in ethnomusicology. At that conference we published only the extended summaries of the papers (Zemtsovsky, 1986). In 1991 the extended paper was delivered at the conference of the ESEM (European Seminar in Ethnomusicology) and the short version of the paper was later published in French (Zemtsovsky, 1993). The full text of the paper was finally published in Russian in June 2006 (Zemtsovsky, 2006).

This is a fact that no musicologist would try to deny – antiphonal and responsorial singing is an integral part of the polyphonic tradition. Even in traditional monophonic cultures, when groups of people sing together in unison, alternation between a soloist and a group, or two groups is widespread. That's why I included antiphonal and responsorial singing as one of the crucial elements of the hypothetic "primordial" or "proto- polyphony" of our hominid ancestors.

Let us now try to put together the human **questioning** behavior and the phenomenon of **dialogue**, two basic elements of human communication. I hope most of the readers would agree that we do not need much speculation to imagine the close evolutionary connections between these two phenomena. The connections are so obvious that I think it would be difficult to argue that questioning and dialogue could exist without each other.

They actually could. Humans can have a dialogue without asking questions to each other, just sharing ideas, opinions or stating facts, something like this:

"Last night I watched the Australia-Brazil game on TV"

"I did not. I had to get up early in the morning so I went to sleep early".

"I think Australia was a bit unlucky to lose."

"Maybe, but Brazil could have scored more goals as well".

There are no questions and answers in this dialogue, although during the conversation they share ideas and opinions, agree and disagree with each other. The same way we may ask questions of ourselves ("What should I do now?") or to animals ("Pussycat, where did you get your stripes?") or even others ("Why are you

doing this to me?") without a real dialogue, or when we do not expect to hear the answers. But of course, questions are predominantly asked of others in order to hear their replies.

Few Basic Questions about Questions

As the years passed after 1996, I became more and more convinced that the human ability to ask questions was something crucially important and deep in the evolution of human language and intelligence. During the last few years I delivered a few papers, talks and seminars on this subject at conferences and seminars and published a few articles on the subject (Jordania, 2000b, 2001, 2002, 2003, 2005). And of course, I was constantly looking for any existing publications on the origins and evolutionary importance of human ability of asking questions.

Let me ask a few very simple and very straight questions about the ability of asking questions that I am going to discuss in the following few pages:

- ➔ ***Why do we ask questions?***
- ➔ ***What evolutionary advantage could the ability of asking questions have given to human individuals?***
- ➔ ***What evolutionary advantage could the ability of asking questions have given to human groups?***
- ➔ ***Who asked the first question?***
- ➔ ***Is asking questions a uniquely human ability or do we share this ability with a few other species, at least with the apes?***
- ➔ ***Where did the phenomenon of questioning came from – are there any evolutionary prerequisites for questioning behavior?***
- ➔ ***Who could answer the first question when it was asked?***
- ➔ ***Is the question one of the higher functions of syntactic structures?***
- ➔ ***Is there a genetic component for questioning behavior?***
- ➔ ***Do we learn to ask questions? And if "yes", how do we learn to ask questions?***

These and a few other topics are discussed on the following pages.

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• Why do we ask questions?

This is one of the easy questions to answer, and I was wondering whether I need to ask this question at all, but then decided that we need to recall to ourselves how important is questioning behavior in our lives. We ask questions for lots of different social and scholarly purposes, generally to find out something that we do not know and we think others might know. Of course, we may sometimes ask questions to check whether others know the answer (I loved making quizzes in my school years), but mostly we ask questions when we want to gain some knowledge about totally different things, such as the social plans of our teenage children for the coming weekend, the result of the soccer game that finished in the early morning hours, or the name of the first composer to use polytonality. According to the information requested in our questions, we may ask members of our family, call our friend, go to the Internet, or go to the library. Throughout our life we ask questions. 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 asking questions, we have huge libraries and a staggering amount of available information because people were constantly asking different questions and were 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 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 our ability to ask questions our brain would be a closed system, limited by the knowledge of our immediate experience**.

• What evolutionary advantage could the ability of asking questions have given to human individuals?

If the reader can imagine two individuals, one of whom is able to ask questions, and another one who for some reasons does not have this ability, the intellectual and social advantages of the "questioning" individual will be quite obvious. A questioning individual can solve problems more easily, can easily access and use the knowledge of other members of society, and can better manipulate people and information for her/his own advantage. Even without asking questions of other members, just being able to formulate questions in her/his own mind would help tremendously in finding the right strategies to achieve different short-range and long-range goals. Human reasoning must have started with the emergence of the ability to ask questions.

Readers might object that this comparison is artificial, because there are no humans who cannot ask questions. First of all, there are some rare cases when for

some reason humans are not able to ask questions (and we will discuss such cases soon), but most importantly, let us not forget that we are not discussing our contemporary society only. We are trying to discuss the evolution of language and the mental abilities of our distant ancestors. So the question about two individuals, one of whom is able to ask questions and the other who is unable to ask questions, must be understood in the context of hominid and human evolution: what advantage would the first "questioning hominid" have when the ability of asking questions emerged at some point in human or hominid prehistory? The advantages seem to me so obvious and so important that I think it would be fitting to declare that **with the emergence of questioning behavior the evolution of our mental abilities made a crucial turn towards human intelligence.**

Maybe the most important consequence for each "questioning" individual is that the emergence of the question phenomenon turned the hominid brain into an **open, self-developing system**. We self develop cognitively by asking questions and looking for the answers. A child develops by asking an array of questions, and the "runaway brain" evolution (Wills, 1993) begins with questions -- both in phylogeny and ontogeny.

• What evolutionary advantage could the ability of asking questions have given to human groups?

Although we have just discussed the advantages that the new ability to ask questions would give to the first human, the true winner of the new ability of asking questions must have been the whole group, the first human society. This advantage must have been particularly obvious when the whole group had the mental ability to ask questions.

If you imagine two groups of humans or hominids, one asking questions of each other within the group, and the other group members unable to ask questions of each other, the difference will be so obvious and big that it would be correct to speak in the first case about group of humans, and in the second case about hominids, or pre-humans. The ability of asking questions drastically changes the intellectual capacity and behavior of the group.

The evolutionary significance of the ability to ask questions first of all was a revolutionary enhancement of the cognitive ability of a whole group of individuals, by **coordinating** their cognitive abilities. Suddenly the members of the first human society started asking each other questions, more actively sharing information and discussing problems. With the appearance of the ability to ask questions **hominid communication** of exchanging information turned into a **human dialogical communication**. This new ability to formulate and ask questions created totally new phenomena -- **group cognition** and **mental cooperation**. The unique human ability of mental cooperation pushed our ancestors on to a completely new stage of cognitive development, previously unknown to the animal kingdom. Therefore, the importance of the new ability to ask questions was not only an increased cognitive ability of *each*

hominid individual, but also a **revolutionary new level of group cognition and mental cooperation**. We can conclude that, with the emergence of the ability of asking questions, each member of our ancestors' society became smarter, but the combination of these smart individuals, put together as a discussing group, was much bigger than the simple sum of several smart individuals. I suggest that **our ancestors passed a cognitive threshold after they started asking questions**.

With the emergence of the ability to ask questions human language gained the last of three main language functions - declarations, commands and questions (about these three functions of language see de Laguna, 1963 [1927]). G. Revesz wrote about three functions of language as well: imperative, indicative and interrogative (Revesz, 1956).

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 information exchange means available in a society. We could distinguish several most important changes in the evolution of human information exchange. The **ability to ask questions** was the first and truly revolutionary change in this chain of technologies 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. We can even say that all the following revolutionary changes in information exchange were just the technical means of enhancing our ability and desire to exchange information. After this we never stopped inventing different ways of asking each other questions. So we started asking questions using speech (do not forget – we started asking questions before the advance of articulated speech!), later – written language, handwritten and published books, telephone, radio, TV and the Internet. 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, apart from a small moment of shared human behavior when we asked for the information that we needed and they knew the answer.

• So, Who asked the first question: or "Interrogo Ergo Cogito"

Here we are, answering the question of questions, posed in the title of this book. 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 there is another quite precise way to answer this question:

The first question was asked by the first human being.

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 was heading towards this crucial point, so the appearance of the "questioning gene" must have

been a relatively smooth transaction. Hominid group-based survival strategy on the ground, everyday co-operational activity, an increased load of communication and more complex social politics within the bigger groups was leading towards this revolutionary change in communication. The advantage that the first questioning human gained from this new ability must have been so big that with every new generation the number of questioning humans (transmitted genetically from the first human individual) must have increased like a bushfire.

Was the ability to ask questions initially used in everyday referential communication or in ritual singing with possibly a referential text? I have already mentioned the fact well known to ethnomusicologists that responsorial singing is one of the strongest universals in human singing traditions. I propose that **hominid responsorial singing (through the question intonation) together with increasingly complex social interactions in hominid groups were the main factors that prepared the way for the emergence of the human ability to ask questions**. And as soon as the new ability of asking questions emerged with the first human being, it must have been used in both responsorial choral singing (a human soloist asking questions and the hominid choir responding together with the stereotypical answer) and everyday referential communications.

At the end of this small section that directly answers the main question posed in the title of this book let me employ good old Latin in a symbolic way.

"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 later translated into Latin). In the light of the evolutionary importance of human questioning behavior I would like to suggest another similar saying, with obvious evolutionarily implications**: "Interrogo Ergo Cogito" – "I ask questions, therefore I think".**

• Is asking questions a uniquely human ability or do we share this ability with a few other species?

This is the most difficult, controversial, interesting and possibly most important "question about questions". If apes do not ask questions (or in other words: do not have the mental ability to ask questions), we may be able to claim that the ability to ask questions is a mental ability that only humans possess, an ability that gave humans the edge to be a distinguished member of the animal kingdom. I hope the few following pages might generate a discussion on this subject among experts of primate communication.

The idea of the uniqueness of human language has been seriously challenged during the last few decades. Fascinating results of studies, teaching ASL and other non-vocal forms of languages to the apes (Gardner, Gardner, 1969, 1975; Premack, 1976; Premack, Premack, 1983; Terrace, 1980; Patterson, Linden, 1981; Savage-Rumbaugh, 1986; Rumbaugh et al. 1994), as well as the wonderful body of studies of

vervet monkeys' alarm calls (Struhsaker, 1967; Cheney, Seyfarth, 1990) proved that we are much closer to our closest living relatives through our linguistic and cognitive capacities than we could have imagined earlier. Virtually all the design features of human language formulated by scholars a few decades ago (Hocket, 1959, Hocket, Archer, 1964) – displacement, duality of patterning, traditional transmission, openness, arbitrariness, productivity, were found in the animal kingdom as well (and not only among the apes). Discussions continue, and the opponents of continuity theory (the foremost being linguists) often dismiss all the achievements of primates.

Whether apes could ask questions was an important problem in the 1970s and the 1980s, although the ability to ask questions was assessed **only in the context of primates' ability to form a syntactic structure**. Maybe that's the reason why this discussion was never perceived as a potentially crucial point of difference between the apes' and humans' mental abilities. The 1970s and 1980s was a booming period of 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). The achievements of the bonobos were particularly impressive. These achievements lead the head of the experiments, Sue Savage-Rumbaugh, to declare: "…apes posses the cognitive capacities for language but lack the proper organ of expression" (Savage-Rumbaugh et al., 1993:109), and "Kanzi's ability to understand human speech suggests that, if apes could produce human-like sounds, they might well invent and utilize a language that would be similar to our own, although probably considerably simpler" (Savage-Rumbaugh et al., 1993:107).

Regarding questions, it has been documented for a few decades already that the vocabulary of the enculturated apes contains question words as well, like "Who", "What", Where" in Washoe's and Nim's vocabulary (Bronowski & Bellugi, 1980:110; Terrace, 1980:11, 167). 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. Wonderful examples of conversations with their human teachers have been recorded and published (Terrace, 1980; Gardner & Gardner, 1975, 1984; Premack, 1976; Rumbaugh, 1977; Rumbaugh & Gill, 1977; Patterson & Linden, 1981). Analysis of their conversations shows that in human-primate conversations **questions are asked by the humans** only. The same can be said about the question words: **apes understand them and give appropriate responses, but amazingly they themselves do not use question words in conversations with their human teachers**.

The apes' ability to comprehend questions is quite amazing. Describing Nim's ability to be engaged in conversations on many topics, Terrace notes: "...His teachers would ask him questions such as What color?, What name of?, Who?, ... Nim showed his comprehension by making an appropriate response... As his ability to sign improved, Nim began to reply to his teachers questions with more than one sign" (Terrace, 1980: 166-167). But the ability to ask questions proved to be much more difficult.

Ann and David Premacks designed a potentially promising methodology to teach apes to ask questions in the 1970s: "In principal interrogations can be taught either by removing an element from a familiar situation in the animal's world or by removing the element from a language that maps the animal's world. It is probable that one can induce questions by purposefully removing key elements from a familiar situation. 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, is Sarah's case 'My food is ?' Sarah was never put in a situation that might induce such interrogation because for our purposes it was easier to teach Sarah to answer questions" (Premack & Premack, 1991 [1972]:20-21).

More than a decade later after writing these words of how to teach apes to ask questions, Premacks wrote: "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). Amazingly, Sarah would sometimes "steal" the words from the trainers, and then she would happily **repeat the questions asked by trainers to her and then repeat her own answer**. And still, she never herself asked trainers any questions.

Earlier Washoe also failed to formulate and ask questions, though that was one of the aims of the Gardners' project (Gardner & Gardner, 1969, 1975; Bronowski & Bellugi, 1984:110; McNeill, 1980:152-153). Despite all their achievements, Kanzi and Panbanisha do not seem to possess the ability to ask questions as well. At least, Sue Savage-Rumbaugh and her to-authors never seem to have claimed this so far (Savage-Rumbaugh, 1986; Savage-Rumbaugh and Levin, 1994; Savage-Rumbaugh et al., 1993, 1998, 2001).

The only case when it was claimed that an ape asked a question that I am aware of was connected to the chimpanzee Lana. (Lana was a chimpanzee that participated in Duane Rumbaugh's experiments in the 1970s.) "When the machine [food-giving machine] was broken and food could not be loaded, Lana was able to ask: '?You move food into room?'" (Savage-Rumbaugh & Levin, 1994:143-144) Even if this is the case of an ape asking a question, it would be strange to consider the possibility that apes would ask a question of a machine (who can not give them an answer) and would never ask questions of their human trainers, who can interact and give them answers. Given the natural curiosity of the apes, it would be natural to

expect that if apes know how to ask questions, they would be asking plenty of questions.

So, according to our current knowledge, despite all their cognitive achievements, apes do not ask questions. They are apparently very good in replying to human questions, and they do **understand quite complex requests and questions**, but **fail to ask questions**. In cases when they begin a conversation, their utterances are either statements ("Bird there"), or orders/requests ("Play me", "Tickle me", "Me more eat", etc). There seems to be something very important in this fascinating fact, something connected with the evolutionary distinction between the cognitive capacities of apes and humans.

Accordingly I would suggest that it is not the recognition of ourselves as individuals that makes us humans (we know that apes, at least chimpanzees and orangutans, are as good as humans at recognizing themselves in the mirror). It is, rather, **recognition of other members of the society as individuals with equal cognitive abilities and the employment of their cognitive abilities as a source of information (asking questions), that makes us human, and our language -- human language**.

There is a subtle connection between the ability to ask questions and the "theory of mind". Reference to the cognition of another individual as a **source of information** should be considered one of the highest forms of the "theory of mind" (or TOM. Premack & Dasser, 1991; Cheney & Seyfarth, 1991; Povinelli, 1993; see also Mead, 1934). According to the available information, apes lack this ability: "The chimpanzee has passed tests suggesting that it attributes states of minds to the other one. These states, however, are either motivational..., or perceptual... Decisive evidence for the attribution of informational states is still lacking (Premack & Dasser, 1991:265).

The fascinating fact about the TOM and questioning behavior is that children learn the mystery of asking questions long before they show the development of TOM. This is fascinating, as apes are able to acquire at least some elements of TOM, which appears around the age of four in children's development (Astington & Gopnik, 1991:12), but at the same time apes seem unable to learn questioning, which appears in children's development in the form of correctly pronounced question intonation much earlier – before a child turns even one (Crystal, 1987:241, 143).

Apes in their natural environment. Studies of monkeys and particularly apes in their natural environment give us important information. It is well known that apes (and monkeys) are skilful extractors of information from the adult members of the group who do not donate the information (King, 1994:143). Other animals (dogs, for example) can also easily elicit information by observing (or even sniffing) humans or animals. The question is whether animals possess **special communication signals to inquire about the informational state of another individual** (the essence of question phenomenon).

According to Fossey, gorillas have a special "question bark", which indicates very mild alarm or curiosity (Fossey, 1972; Marler, 1976:241). Mostly devoid of

communication context, the "question bark" cannot really be considered as questioning behavior. It is rather a sign of curiosity. Chimpanzee vocalizations are much more important for our discussion. J. Goodall describes special **inquiring pant-hoots**, which "...tends to rise in pitch toward the end of the series and is almost always followed by a pause during which the caller listens intently and (if at a lookout position) scans the surrounding countryside. A chimpanzee who hears another pant-hoot often responds by calling (usually with pant-hoots, sometimes also with *waa-barks* and even screams); thus the individual who initiates this question-and-answer exchange will learn both the identity and the whereabouts of those who reply" (Goodall, 1986:134).

Could this be considered questioning? In a certain sense it may seem so, as the caller who initiates this "conversation" apparently needs to hear the voices of its own kind to identify them and learn their whereabouts. In this context the rising of the pitch toward the end of the series seems particularly important, as it obviously resembles human question intonation (also rising at the end and requiring an answer). But a closer look suggests that inquiring pant-hoots might be in fact **statements** (not questions), and their function is to maintain audio contact within the group:

(1) The reply to the inquiring pant-hoots usually is the same series of inquiring pant-hoots, with rising intonation at the end. This kind of response seems difficult to accept as an "answer to a question". It seems more plausible to suggest that an inquiring pant-hoot is a kind of statement ("Here I am!", or "Here we are!" or even "Hey!"), rather than inquiring or questioning ("Who is there?", or "Is anybody there?");

(2) The same type of rising-at-the-end pant-hoots are also used by chimpanzees spontaneously, without any need of information and without expecting a response (see Goodall, 1986:134-135, section *spontaneous pant-hoots*). This also suggests that inquiring pant-hoots are in fact statements, not questions;

(3) Most importantly, enculturated chimpanzees do not use interrogatives in laboratories where they are successfully taught complex forms of communication. Although in laboratories they demonstrate incredible cognitive abilities, much beyond the level of their free-ranging relatives, and although they are familiar with interrogative sentences, still they do seem not ask questions. It seems very unlikely that chimpanzees lose the ability to ask questions in captivity.

Questioning-like behavior has been suggested in other primates. David Symmes and Maxeen Biben suggest three criteria to establish the presence of a **conversation** among animals: (1) turn taking, (2) directionality of change in acoustic structure, and (3) bidirectionality of information transfer (Todt et all., 1988: vii; Symmes & Biben, 1988: 123-32). According to the research of Symmes and Biben, squirrel monkeys' vocal exchange can be characterized as conversations. Regarding the ability of squirrel monkeys to ask questions, Symmes and Biben suggested, "animals are seeking information by questioning and receiving information from answers" (Symmes & Biben 1988:131). I understand it is not easy to be sure **what** the squirrel monkey are "talking" about, or whether they really ask each other questions, but it seems unlikely to me that monkeys can ask questions when more cognitively developed apes do not seem to possess this ability. Bateson and Trevarthan coined a special term "proto-conversation" for the early forms of communicative interaction (Bateson, 1975; Trevarthan, 1979)

Therefore, the foregoing evidence suggests that

- Our closest living relatives understand human questions and can respond accordingly on a level of a human child roughly about 2.5 years old (Savage-Rumbaugh, 1994);
- Chimpanzees in the wild have vocalization that has elements of questioning behavior (enquiry about the whereabouts of other members of the group, and most importantly – the human-like terminal rising question intonation);
- According to published results, apes were not able to learn how to ask questions in the experiments, despite their widely known curiosity.
- The **reason for this inability could be the genetic limitations of the apes' brain**. These limitations do not allow for the mental ability from which apes would learn questioning, or to inquire about the informational state of other individuals.

• Where did the phenomenon of questions came from – are there any evolutionary prerequisites for the questioning behavior?

Yes, there are at least two of them. First of all, an evolutionary prerequisite of the question phenomenon is **curiosity**. I think it is safe to declare that a question without curiosity cannot exist, although curiosity without a question is widespread among higher animals. Every one who has ever had pets would agree that curiosity is a natural part of animal behavior (about the role of play and curiosity among animals see Lorenz, 1971). Although curiosity and the ability to ask questions are closely related, there is a big difference between these two phenomenon as well.

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If curiosity is a natural desire of higher animals to know more about the world around them, the ability to ask questions is the most powerful strategy of the mind to satisfy curiosity.

I would suggest that the **question is "materialized curiosity".** Although a question is formulated by an individual, when it is formulated as a communication signal it makes possible an enormous innovation: involvement of all members of the group in settling the problem. So, when "materialized" in a question, curiosity becomes a powerful engine, pushing cognitive development far ahead.

Another crucial element of the future human questioning behavior among animals is **question intonation**. Question intonation is much more limited in the animal kingdom than curiosity, and chimpanzees might be the only species that posses it (outside of genus *Homo*). Although question intonation still does not seem to be used among chimpanzees for inquiries about the informational state of each other's minds, the use question intonation among chimpanzees as an "open structure" that leads to vocal exchanges must be one of the most powerful evolutionary indications of the later human ability to ask questions. Following Derek Bickerton's popular term, protolanguage, we could call the "inquiring pant-hoots" used by chimpanzees, with the rising intonation, but still not used for inquiring into the information states of each other, **proto-question.**

• Who could answer the first question when it was formulated?

This is a methodologically very important question. We all know that any kind of evolutionary progress, whether that be a result of human invention or of gene mutation, will make an impact on the individual's survival chances and will be included in evolution only if the environment provides a basis for the positive use of this new ability at the very moment of the appearance of the new genetic ability.

By the time the genetic mutation brought to life the new revolutionary ability to ask questions, the situation could be volatile: there was possibly only one, the very first human being with the new human ability to ask questions. So what could she or he do? How to use the new ability? It might seem that without other humans around able to answer the first questions of the first human, this new ability would be to no avail and of no advantage.

The answer to this ostensibly difficult question is very clear and easy: **we can be sure that all members of the hominid groups of our ancestors were able to answer the question of the first human**. I am confident of this because 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 questions,

the situation in hominid groups was very “fertile” for the use of this new ability. It might sound amazing, but for a few million years our ancestors (including apes) were cognitively ready to answer questions, although there was no one around to ask them any questions.

Another question would be the same as the one I asked the supporters of Noam Chomsky’s suggestion of the “monster genetic mutation”. We all know that for the normal development of infant mental abilities it is crucial that from a very early period the infant is surrounded by adults who can show examples of the use of the ability present in the infant’s genes. How would the first human infant develop her/his ability to ask questions without early examples and encouragement of this ability from adults?

The already existing “protoquestion” (“inquiring pant-hoots” containing the rising intonation) among the wild chimpanzees can give us a clue to the answer to this difficult question. The first human could well hear examples of vocalizations with the rising questioning intonation from the adult members of her/his social group. We can be sure that the first “real human” questions, inquiring into the information state of other’s minds, were also asked with the help of the question intonation only. Even today all human infants of all races and language families start asking their first questions using the questions intonation only.

• Is question one of the higher functions of syntactic structures?

M. Tomasello mentions the ability to ask questions as among other more complicated grammatical structures acquired by children in the later stages of their language development: "...later... [after the age of two] children begin to use a variety of specialized discourse structures that differ in various ways from the prototypical events of interest to 2-year olds. Children learn to produce the conventional form of such things as questions, passive sentences, and sentences with embedded clauses" (Tomasello, 1996:297). Later he repeats this idea "...the kind of discourse-communicative functions that arise in linguistic interactions with others are an integral part of the acquisition of the more complex sorts of grammatical competence: question asking, passive sentences, and the like (which may be the exclusive province of human beings)" (ibid, 300).

Putting the ability of asking questions together with other more complex grammatical structures does not seem right. Although children do start creating syntactic structures to ask their first “syntactic questions” after the age of two, they definitely do not start asking questions during the third year of their development. Here are a few facts and considerations about the question intonation and question as a grammatical/syntactic structure:

• Questioning is the grammatical category that can be formulated on the one-word stage of language development, **without the use of syntax**, just with the help of the ancient vocal medium – **pitch**.

• Question intonation is arguably the **biggest universal of human languages** and communication. All languages of the world without exception, tonal, non-tonal, intonational and accented – use the rising "question intonation" for the "yes-no" questions, very popular in human communication (Bolinger, 1972:314; Cruttenden, 1986:169-174). [The **only** dubious exception reported in 1946 was Chitimacha, but as "only **one** person was reported as speaking the language, we should not pin too much theoretical significance to this statement." (Swadesh, 1946:317, cited from Cruttenden, 1986:158)]

• According to Chomsky, the grammatical means of formulating questions are also among the strongest **syntactic universals** of the languages of the world (Chomsky, 1957), although the use of **question intonation** to formulate questions must be evolutionary earlier.

• According to child psychologists, question asking appears among children in the form of question intonation in the babbling stage of their language development before they turn one, much **earlier than the use of *any* grammatical structures**.

All these facts strongly suggest that the origins of question intonation and the general human ability to ask questions must be amongst the oldest, most basic and most important elements of human communication and human language. Most importantly, despite its crucial importance, the emergence of the question phenomenon was not connected with the late stages of language development. Questions could have emerged at the earliest, pre-syntax, "one signal" stage of language development. The syntactic forms of questions that Chomsky is talking about must be a later phenomenon.

The foregoing strongly suggests that although the ability to ask questions was created for communication and expressed by communicative signals, its emergence was **primarily an event of cognitive significance. This was a cognitive revolution, leading later to language and social revolution.**

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• Is there a genetic component for questioning behavior?

The absence of the ability to ask questions among apes, who successfully communicate with their human trainers using elements of language and simple sentences, who can comprehend complex sentences with embedded meanings, can manipulate their trainers using elements of the TOM (theory of mind), understand the idea of question, know the question words and can answer complex questions, but at the same time still do not use them in communication and do not ask questions can give us a clue about the genetic character of questioning.

A couple of suggestions made by scholars as to why apes do not (or can not) ask questions also suggests there is something in the inner organization of their intellectual abilities:

- David McNeill, discussing Washoe's problems in forming interrogative and negative questions, wrote: "The reason she did not [produce the simplest negatives and questions] must have something to do with the degree of internal organization they require" (McNeill, 1980:152).

- Premacks suggested that Sarah's failure to ask questions was "due to its inability to recognize deficiencies in its own knowledge." (Premack & Premack, 1983:29).

Both of these suggestions point to the fact that the mental processing in our closest living relatives is different from human mental processing, and circumstantially **point to the possibility of a genetic difference** between the apes' and humans' mental abilities.

I can not help myself repeating that if the apes had the ability to ask questions, they would be asking innumerable questions of their trainers, very much like the 2-3 year old children whom they so much resemble in their curiosity and syntactic comprehension.

- Questions and mental retardation. Interaction between the question phenomenon, intelligence and language seems particularly interesting in the light of different cases of mental retardation. Neurologically, language and intelligence seem to be independent (at least partially; see Aitchison, 1996:39-43; 2003), because: (1) individuals with immense problems of language and speech production can have intact intelligence (some forms of Broca's aphasia and cases of Specific Language Impairment. Review: Pinker, 1994:48-50); or vice versa, (2) severely intellectually impaired individuals might possess grammatically fluent language and perfect speech (hydrocephalic children, schizophrenics, Alzheimer's patients, some autistic children and William syndrome patients. Review: Pinker,

1994:50-53). As for the question phenomenon, it seems to be connected with intelligence rather than language and speech. I suggest that intact intelligence would **always** contain the ability to ask questions, while, in at least some forms of mental retardation, fluent speakers may lack this basic cognitive ability.

A study of the genetic components of some forms of **autism** could give interesting results, as autistic children find it notoriously difficult to learn questioning behavior. At the same time, it seems that autistic children lack not only the questioning behavior but they lack curiosity as well. It would be particularly interesting to check whether there are any instances where curiosity is present but the ability to ask questions is not.

- Questions and Genie: Do we learn to ask questions?

Another very important question about human questioning behavior is whether we **learn to ask questions** at some early stage of development, and if we do, **how** we learn this. Most of our mental abilities, including genetically predetermined language acquisition, depend on learning, or "triggering" the genetic mechanisms, and it would be natural to expect that our ability to ask questions is learned at some stage as well.

A few cases of "wolf children" from recorded human history would be particularly interesting to investigate in this context, but no data is available on this matter that I am aware of. The only possibility to discover whether questioning behavior depends on learning at an early age would be to check the case of language development of a girl known as "Genie".

Genie was found wandering together with her mother in 1970 in the Californian streets. It was found later that her father imprisoned her from early infancy and kept her from any exposure to human language. She was about thirteen years old and could not speak. Later Genie acquired limited speech and could communicate with others. Her speech never reached the normal human capacity of syntactic complexity, and her sentences were no longer than 2-4 words. Derek Bickerton put Genie's language in the category of "protolanguage" together with the language of children under two, ape language and pidgin languages.

Most importantly for our discussion, Genie failed to learn to ask questions: "She had great difficulty in formulating questions – when she wanted to know the name of something, she gestured or pointed at it but did not learn to ask its name" (Wills, 1993:288). As tests made it clear that Genie had a normal intelligence, her failure to learn how to ask questions can only be explained by the fact that **she was not exposed to questions and language behavior in the critical period.**

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- Questions, apes and children

Another important sphere related to the question phenomenon is the comparative study of apes' and children's cognitive and linguistic abilities. There are principal differences on this matter among different scholars. One group of scholars (led by the experiments conducted by Sue Savage-Rumbaugh and associates) claims the mental abilities of apes are comparable to the mental abilities of a 2 – 2.5 years old human child. Another group of scholars dismisses such claims.

Comparing apes' and children's cognitive abilities, scholars mostly use tests based on **understanding** questions and orders and **replying** (and acting) on them appropriately. As Savage-Rumbaugh and her associates' experiments suggest, bonobo Kanzi can understand human questions and requests roughly as well as a human child aged two-and-a-half years old. Can we conclude that Kanzi's intellectual development is comparable to a child aged two-and-a-half years old? Despite the fact that the achievements of Kanzi and Panbanisha in the comprehension of the human language are very impressive, I think it is a bit controversial to make a judgment about children's and apes' mental abilities on the basis of understanding and answering questions and requests **only**. Two- and three-year-old children could give the same kind of replies to questions and requests as enculturated apes, but we should not forget that, unlike the apes, children ask an array of questions at that age, and even before that age. The strength of human intelligence seems to be in the uniting of individual brains into the "mental web" of our shared knowledge, and the ability to ask and answer questions seems to be the crucial element of this unique mental cooperation.

So, unlike the apes, children from an early age possess the human ability to formulate and ask questions to enlarge their knowledge by referring to the cognition of other members of society. This crucial distinction should not be forgotten when comparing ape and child mental abilities. According to the existing literature, children start using correctly pronounced question intonation and asking their first simple questions at the babbling period of their development (Ferguson, 1977; Crystal, 1987:235, 243, 248; Moskowitz, 1991:147). Despite my deep appreciation of the linguistic achievements of our closest relatives, unless it is demonstrated that apes can learn to ask questions, we should conclude that **even the mental abilities of one-year-old child has a unique element that is beyond the mental ability of the most advanced of our closest relatives**.

I suggest designing a special set of experiments to encourage apes to ask questions, and I cordially wish them success in this endeavor. Kanzi and Panbanisha proved many times that their mental abilities are beyond our expectations, and it is possible that they have the ability to ask their human friends some simple questions (like "Where banana?") as well. I want to repeat again that **asking questions is not a matter of constructing syntactic structures (questions do not need any syntactic structures), but it is a matter of cognitive abilities**.

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• Questions and Protolanguage

Before we discuss the means that help infants learn the art of asking questions, let us very briefly discuss the notion of "protolanguage", suggested in the works of Derek Bickerton (Bickerton, 1981, 1990, 2000, 2003). The idea of protolanguage rightfully became very popular, although discussions about what is the nature of protolanguage still continue (see, for example, Mithen, 2005:3).

Bickerton suggested that for a long period of time during the hominid evolution our human ancestors were using a very simple surrogate of contemporary language, where the words were present, but no or very little grammar was involved. In appreciation of this simple and very useful suggestion I agree with the many scholars who view the notion of protolanguage as one of the central elements of the evolutionary development of human language. Here I want to concentrate on one specific problem:

According to Bickerton, protolanguage is present among four different categories: (1) trained apes, (2) children under two, (3) Genie and "wolf 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**. Although syntactically they might look alike, the difference between these two groups on a cognitive level is enormous. Those who cannot ask questions are locked inside their own mental world and cannot develop further. Those who can ask questions have the ability to develop mentally and to become a part of the great information web of humanity. To say this more simply, the members of the second group are in the human cognitive family, whereas the members of the first group are not. 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 "wolf children" – who do not ask questions,** and

(2) **Children under two and pidgin users – who can ask questions.**

I suggest that the difference between these two groups is too important on a cognitive level to remain in the same category of language users. I suggest recognizing the second group only (those who **can** ask questions) as human protolanguage users.

It is very important to remember that the members of the former group (signing apes, and Genie and wolf-children) have **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 (at least it seems so at this moment). Genie and wolf-children, however, have 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 behavior, in which inbuilt guidelines help the learner**.

- How do we learn to ask questions?

Learning to ask questions, or "waking up" our genes that provide us with the cognitive ability to ask questions, must happen in early infancy, no question about that. Children use correctly pronounced question intonation before they can pronounce their first words. Another self-evident suggestion would be that questions are unintentionally "taught" by parents to their children.

I hope most readers remember talking to their own (or even other's) very young children. Somehow, instinctively, we all start **asking questions.** Of course, we do not ask them questions because we want to hear their responses – they are too young to respond, and the questions themselves, with often silly and self-evident answers and plenty of made-up cuddly-words, are not the ones that we would ask our colleagues or adult family members if we are interested in their opinion. These questions are specially designed to get an emotional response from the infants.

Most interestingly, it seems to me that **our infants with their responses actually teach us, parents, the correct way of interaction** with them. If you speak to an infant in a "serious" tone for a few minutes, and then start speaking with an emotionally loaded tone with very significant pitch modulations and asking questions, the response of the infant will immediately change. It will become more active, and the infant will immediately look happier. I think this way, through this kind of feedback, infants "encourage" parents to speak to them with exaggerated pitch modulations. Why do infants enjoy and better respond to an adult's speech when it is full of pitch modulations? I guess the answer to this question is **in our pitch-based evolutionary past and brilliant musical hearing of human infants** (as we may remember, **most of the infants have perfect pitch, which is extremely rare among adults)**.

I have not mentioned yet, but most readers would guess that when I am talking about adult's speech to infants, containing exaggerated pitch modulations, I am talking about the well-known phenomenon known sometimes as "baby talk", or "infant-directed speech", or "motherese".

Richard Byrne proposed that baby talk is an "unintentional way for teaching grammar" (Byrne, 1995:122), and that it is "an ideal vehicle for helping the child… to learn phonology and grammar" (ibid, 37). I find this idea compelling, although it seems to me that the primary task of baby talk is to teach infants two-way question-and-answer-based dialogical communication and, most importantly, to teach them to

ask questions (or: **to activate their genetic ability to ask questions)**. I do not need to argue that asking questions with exaggerated question intonation is arguably the biggest part of baby talk. Infants' particular interest in pitch modulations has been tested and confirmed (Fernald et al., 1989).

- Question of chronology: When was the ability to ask questions born?

If we try to link paleoanthropological data and this revolutionary change in hominid cognition and language, we must take into account that question intonation, the remnant of this cognitive and linguistic revolution, as well as the syntactic means of forming interrogatives, are 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 wide dispersal of human ancestors from Africa (about 2 million years ago). Taking into account these factors, any of the human hominid ancestors could have made this critical step in our cognitive development. If not earlier, this must have happened at least at the stage of *Homo erectus*. Barbara King wrote: "At present, *Homo erectus* seems to represent a kind of turning point for information donation among hominids" (King, 1994:109)

Therefore, the time range for the emergence of the question phenomenon is supposed to be around 2 million years ago. Thus, the Australopithecines, with their asymmetric brains and voluntary vocalizations, did not ask questions yet.

According to this suggestion, Homo erectus was the first human to cross the cognitive threshold, leaving behind the animal kingdom. Consequently, there is no "difference of kind" between the cognitive and linguistic abilities of Homo erectus and Homo sapiens. This proposal complies with the idea about the equation of the taxons Homo erectus and Homo sapiens as expressed by some anthropologists, who have mostly supported the multiregional evolutionary model (Weidenreich, 1943:246; Jelinek, 1978, 1981; Wolpoff et al. 1984:465-467; Wolpoff, 1989, 1999:395-97; Frayer et al. 1993).

Although Homo erectus seems to be the best nominee for the first inventor of the question and for the role of first human, we should also consider the candidature of *Homo habilis*, the first human stone toolmaker (about 2.5 mya). I would suggest that Homo habilis might have possessed the ability to ask questions. As for Homo erectus, it must have definitely had this cognitive-linguistic ability.