TONE

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Summary

Most animals can produce and hear a range of noises. It is on this basis that humans have the ability to make sounds at all, and on wich they evolved their linguistic ability, although they have a special ability which they share with no other animal, and that is the ability to make meaningful sounds, language. One of the features which distinguish man from other animals is the shape and size of the pharyngeal resonator which is capable of considerable alteration in size and shape during phonation. Learning to talk requires the child to master an enormously complex system. Language is arbitrary and the meaning of words is often difficult to discover. A normal child does not only acquire knowledge about how to form grammatically correct sentences, but also about what is appropriate. Communicative competence involves to know when to speak and when not, what to talk about with whom, where, when and in what manner. But even humans do not use their sound producing abilities only to produce spoken language. We, too, utter various sounds other than words, expressing emotions, for example, and we are able to sing. Expressing and understanding emotions is a special brain function, usually located on the right side of the brain. Humans very soon did not only use their body and their voices to produce sounds, but used various objects or built instruments to enhance the sound they could produce.

1. Introduction

Most animals can produce and hear a range of noises, and they use this capability for various ends: to attract a mate, to stake out a territory, to signal the approach of an enemy, or even to express an emotion or inner state. Crickets for example seem to have neural units that code information about the rhythmic elements of their mating songs

and females respond only to the rhythms of conspecific males. Bullfrogs have auditory mechanisms that are structured to respond specifically to bullfrog mating calls. Neurons in the brain of monkeys respond to very specific sounds, too, but are much more flexible, and monkeys can learn to respond to entirely new artificial sounds. Apes can communicate by a combination of sounds, facial movements and gestures.

It is on this basis that humans have the ability to make sounds at all, and on which they evolved their linguistic ability, although they have a special ability which they share with no other animal, and that is the ability to make meaningful sounds, language. It has recently been reported that 200000 years ago a tiny fragment of the gene FOXP2, which is nearly identical to those of mice and apes, changed in such a way that we are now able to speak. The other apes, which have the ability to form concepts and communicate them in sign language – like deaf-mutes –, lack merely this "little" ability to develop an easy form of communication. The larynges of non-human primates are able to produce a number of distinct calls, and it is therefore not the larynx which inhibits them talking, although they cannot produce the same range of fundamental frequencies as humans. Primates can also produce voiced and non-voiced sounds, as well as frequency variations and breath-groups, and stops, although they only use bilabial stops, and may be lacking the muscular control for other stops. (see ***Foundations and characteristics of culture***)

2. The Special Apparatus to Produce Speech Sounds

In apes the larynx exits directly into the oral cavity, while in adult humans the larynx exits into the pharynx. The pharynx is part of the complex filter which modulates the fundamental sound emitting from the larynx, and makes possible the quick changes in the wide variety of sounds which make up human speech. While in theory any audible signal could be used to convey meaning (Morse code for example, using only two different sounds, long and short), most forms of such signals are practically useless. While humans can be trained to recognize and associate arbitrary sounds with letters, errors are frequent, and the listener must concentrate so much on deciphering the code that he usually cannot concentrate on the semantic content. Human speech on the other hand has properties which make rapid acoustic communication possible. Human language involves rapidly executing complex sequences of articulatory movements or making equally complex perceptual decisions regarding the identity of particular sound sequences. At a higher level, complex syntactic relationships must be determined. All this occurs automatically in human adults. The speaker or listener is not concerned with these processes, but instead concentrates on the semantic content of the message. In a similar way other human activities have become "automated", the dancer no longer thinks about how to execute a single step, a person using a hammer or riding a bicycle does not contemplate the individual muscular movements necessary to bring about the results.

One of the features which distinguish man from other animals is the shape and size of the pharyngeal resonator which is capable of considerable alteration in size and shape during phonation. This variability allows a rapid alteration of the filtering properties of the supralaryngeal vocal tract. It is this variability which allows encoding which in turn is needed to achieve the speed of communication necessary in human speech. Encoding

here means that we do not produce or receive isolated phonemes but at least syllable length auditory events. Language production seems to be located in close proximity to motor neuron areas (Broca's area) whereas language perception is located in the auditory centres of the brain (Wernicke's area). Damage to these areas produces aphasia, i.e. the victim leaves out words, uses the wrong syntax, or looses the proper phonetic spelling of words. People with aphasia essentially loose part of the dictionary used to encode ideas in sounds. Language does not necessarily have to involve all of the factors that have structured human language. The probable absence of speech encoding equivalent to that of modern *Homo sapiens* and the presence of a highly developed culture both point to the presence of a different language in Neanthertal culture. Conversely birds have the potential for producing encoded speech signals. Birds such as the mynah can imitate human speech using a sound producing mechanism that does not involve either a larynx or a supralaryngeal vocal tract, although they lack the cognitive ability that is a necessary factor in language.

No language uses all the theoretically possible sounds which linguists have discovered in the languages of the world. There are the stop consonants: depending on where the flow of sound is stopped we get sounds like [b], [p], [d], [t], [g], [k]. Then there are the various nasal sounds like [m] and [n]. Vowels are distinguished by the formant frequency patterns. Most languages have at least an [a], [i] and [u] in their repertoire. It seems that these vowels are produced and recognized with greater accuracy than intermediate vowels like [ɪ], [æ] and [e]. Dialect variations are the reason for some of the vowel confusions, but the intermediate vowels are basically more difficult to recognize. Bilabial stops like [b] and [p] occur more frequently than velar stops like [g] and [k]. Some Southern African languages e.g. use clicks, but they do not distinguish between short and long vowels, whereas that distinction is highly relevant in some European languages. Implosive labials (like a [b], but not explosive) are used in some languages, but not others. Some speakers do not make and do not hear a difference between a [p] and [b]. Which sounds and which difference are significant depends on the individual language.

One of the basic elements of phonation is the breath-group, which enables listeners to group words into meaningful sentences. It is probably one of the most central aspects of language and must have been present in the earliest forms of hominid language. Language would be impossible without this feature, we would be reduced to one-word utterances, each with a fixed, immutable meaning. Language, because of this feature, can transmit new, unanticipated messages. Human language is, of course, not disjoint from other elements of human culture – it serves a purpose in various activities. Analysing the gestures, behaviour and vocalisations of Rhesus monkeys it has been observed that they can be analysed with the help of a phrase structure analysis, that is a form of analysis which works without considering its past history. The behaviour of these monkeys does therefore not involve "memory" of previous states. In contrast the making of advanced Levailloisian stone tools is impossible without memory, and the only way it can be analysed is with the help of a transformational grammar, which formally incorporates memory. Neither can the death rituals of the Neanderthals. The same deep structure can therefore be found in work, rituals and speech of humans. It seems that the sudden appearance of art on cave walls and of many new technological advances, and possibly complex notational systems in the form of engraved patterns in

batons and spear throwers between 40000 and 30000 years ago signals a new development of human cognitive abilities, and it seems that human speech in the form we know it today, originated around that time.

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Biographical Sketch

Peter Horn studied German and English at the University of the Witwatersrand. In 1971 he graduated Ph.D. from the University of the Witwatersrand with a thesis on "Rhythm and structure in the poetry of Paul Celan", and was offered the chair of German at the University of Cape Town in 1974. From 1987 to 1990 he was Dean of the Faculty of Arts, and from 1993-1994 Acting Deputy Vice-Chancellor of the University. He was president South African Association of German Studies (1989-1997), president of the Institute for Research into Austrian and International Literary Processes (Vienna) (2001-), on the executive committee of the Elias-Canetti-Gesellschaft, the National Executive of the Congress of South African Writers (COSAW) (1991 - 1992),the National Executive of the South African Writers' Association. Besides he was Honorary Vice President of the National Union of South African Students (1977-1981), Trustee of the South African Prisoners' Educational Trust Fund (1980-1985), and a member of the Interim Committee of the Unemployed Workers' Movement (1984/5). In 1974 he received the Pringle Prize of the South African English Academy for an essay to the concrete poetry, in 1992 he received the Noma Award for Publishing in Africa (Honourable Mention for *Poems 1964-1989*), and in 1993 the Alex La Guma/Bessie Head Award and in 2000 the Herman Charles Bosman Prize for the short story collection *My Voice is under Control now*. In 1994 the University of Cape Town granted him a Honorary Fellowship for life. Two of his volumes of poetry and numerous other publications by him were banned for possession during the Apartheid regime. His poems are anthologised in most major

anthologies of South African poetry, and more than 100 have been published in journals. He has published numerous contributions to academic books, learned journals, and reviews and review articles.