

Human Evolution: Origins of Language

Theories relating to the development of spoken language can be classified into two distinct categories. The first is the late emergence theory, which suggests that language is a uniquely human trait which arose considerably recently, during the Upper Paleolithic era, approximately 40,000 years ago (Aiello and Dunbar, 1993, p.184). The second is the early emergence theory, which suggests that language predates humans and speculates on both the biological capabilities for speech as well as the mental and cognitive capacity for language in our early hominin ancestors. However, within this theory there are various different hypotheses supposing which of our hominin ancestors first grasped the capacity for language. Some of the arguments supporting early emergence theory are presented in this discussion, which aims to embark on a chronological journey of speech and language acquisition, starting from *A. afarensis* approximately 3.3 million years ago, and exploring a range of theories relating to *H. erectus*, *H. neanderthalensis*, and *H. sapien*.

Perhaps the primary limitation in attempting to ascertain when language emerged is that it is an intangible concept which does not fossilise. Unlike bones and stone, there is nothing physical to date to a specific epoch. Any answer to this question relies on interpreting indirect evidence. However, fossil remains of hominin craniums and ancient DNA evidence can indicate biological capabilities for language, whilst stone tools can reveal much about ancient culture, ultimately forming a picture of whether or not language was used at that time.

In order to explore the origins of language, it is necessary to first define what is meant by “language”. Many believe language to be a uniquely human trait, however the ambiguity of the term paves the way for the contrary. It could be described as a means for vocal communication, however this is a trait we share with many non-human animals. For example, there is a range of meanings communicated by a dog’s bark, but one would unlikely deem a dog capable of language. Thus, language is more specific than communication. Human beings emit sounds from their vocal chords when they cry, scream, or gasp. This is also unlikely to be considered language, highlighting how language is more than sounds that come from our mouths. This raises the question of what components form definitive language.

Perhaps the most significant component of language is meaning. Swiss linguist Ferdinand de Saussure claimed that words have no intrinsic meaning, and that they only adopt a meaning when placed in the structure of a language. He proposed a differentiation of the “signified” and “signifier”, the former of which refers to the concept of something, and the latter of which refers to the verbal or visual symbol that is attributed to the concept (Layton, 2013, p.30). This linguistic theory is significant as it highlights the importance of cognition and the ability to comprehend complex concepts when it comes to using language. When it comes to exploring the origins of language, it cannot be separated from exploring our evolutionary origins of the mind and the ability to form complex thoughts.

The preliminary stages of language could be traced as far back as 3.3 million years ago, during the Pliocene epoch. The skeletal remains of a juvenile *A. afarensis*, presumed to be a three year old female, were discovered in the Dikika research area of Ethiopia.

These fossil remains are considered paramount in revealing the morphology and development of early hominids, as they included bones which had not previously been discovered for this particular species, such as the hyoid bone (Alemseged *et al.*, 2006, p.296). The hyoid bone is the subject of analysis in early hominid fossils in relation to their capacity for speech. In humans and other primates, it is a U-shaped bone which sits below the mandible and aids tongue movement, speech, and swallowing. Steele *et al* (2013, p.648) establish a clear distinction between the morphology of the hyoid bone in humans and African apes, and fossil evidence reveals that the hyoid bone of the *A. afarensis* was more similar to that of African apes than modern humans (2006, p.298). It is important to note that one limitation in analysing the fossils of an *A. afarensis* is their scarcity. Though the Dikika fossils provide pivotal evidence in studying this species, there are few remains with which to compare them.

In exploring capabilities for speech, analysis of the hyoid bone is often considered alongside the presence or absence of an air sac system. Air sacs are air filled cavities presumed to hinder speech capabilities as they reduce the range of distinct sounds which can be produced (2013, p.667). Fossil analyses suggest the presence of an air sac system in early hominids which is absent in later hominins, such as *H.*

heidelbergensis, *H. neanderthalensis*, and *H. sapien* (2013, p.648). This suggests that whilst the hyoid bone may have enabled *A. afarensis* to produce sound, it would have been comparable to sounds produced by chimpanzees. It is possible that the

emergence of language coincided with the loss of air sacs which would date spoken language to no later than the middle Pleistocene epoch. However, this is just one theory, and there is not enough evidence to correlate the loss of the air sac system with the function of speech.

However, it is not simply the loss of the air sac system in later hominin species that suggest the beginnings of spoken language; genetic evidence and interpretation of fossil and artefact discoveries indicates that pre-modern language might have been spoken by *H. erectus*. Hillert (2015, p.1) discusses the difference between a “language ready brain” and the presence of a “linguistic code”, the former of which refers to the biological capacity for language, and the latter of which refers to the design features and structures of language. He suggests that a Homo species may have had a language ready brain, but if they did use language, it would have had a very different linguistic code compared to modern languages. In essence, the way they used language would have been very different to how we do. The features and structures of a language are cultural products which may have evolved alongside biological genetic changes over a long period of time.

There is a significant relation between the ability for modern language and the ability for thought. It seems logical that due to the complex properties of all modern languages, the use of language is related to the ability to form and comprehend complex concepts. For this reason, it is difficult to explore the evolution of language without delving into understandings of the mind and the ability for complex thought, for these concepts are so intertwined. This is one reason that brain growth is often associated with the increased capacity for language. Substantial brain growth began with *H. habilis*, and it is

suggested that factors during the *H. erectus* epoch may have instigated gradual biological adaptations which resulted in the refined use of spoken language (Hillert, 2015, p.1).

Hillert (2015, p.2) discusses genetic data which indicates that the biological disposition for language and cognitive thought and processing is the result of a gradual mutation which may have begun three million years ago. Though there is no conclusive evidence which tells us exactly when it began, genetic data on the evolution of the neocortex supports the idea that the basic principles underpinning modern language were biologically disposed much earlier than previously thought (Aiello and Dunbar, 1993; Hillert, 2015).

During the *H. erectus* epoch, an advancement in stone tools occurred, with Oldowan being gradually refined and replaced by Acheulean tools. This could indicate that cognitive skills co-evolved with the increase in cranial capacity. One theory which supports the notion of early emergence is that speech and language co-evolved with the advancement of stone tool technology, for the reason that cognition would have been required for the development of complex lithic technology (Stout and Chaminade, 2012, p.81). It is suggested that communication would have been necessary for the continuous production of stone tools, and that social learning would have been necessary to share the skill of knapping, which refers to the act of striking stone with stone to remove flakes and produce a tool (Lombao, Guardiola and Mosquera, 2017, p.9). As Oldowan tools are less complex than later tools, verbal communication may not have been necessary for their production; observation and imitation may have been sufficient. However, the more refined tear-drop shaped Acheulean tools with their

bifacial edges would have required considerable skill and practice, for which the verbal transmission of information would have been the most effective way to reproduce functional tools (Stout, 2005, p.336). This demonstrates the logic in drawing a parallel between the advancement in stone tools and the development of both language and cognitive thought.

Genetic evidence relating to cortical development in the hominin lineage suggests that whilst *H. erectus* may have conceived fundamental principles underpinning modern language, it was not until the appearance of Neanderthals and Denisovans that spoken language was used in a similar way to modern humans (Dediu and Levinson, 2013, p.12). It is proposed that, according to ancient DNA evidence, human evolution was not a clear singular progression in lineage, but rather the result of related lineages (Human, Neanderthal and Denisovan) interbreeding and exchanging genes (2013, p.4). One such gene which we share with our more recent hominin ancestors is the FOXP2 gene, a gene which is attributed to the use of language (2013, p.4). This supports the hypothesis that Neanderthals used language.

Further to DNA evidence, there is fossil evidence to support the claim that Neanderthals used spoken language. The hyoid bone of the Neanderthal is similarly modern to that of a human, and in that sense differs greatly to the one found in *H. erectus* or in the *A. afarensis* found in Dikika, Ethiopia (Dediu and Levinson, 2013, p.6). Though this is not enough to confirm a capacity for speech. Another anatomical feature found in Neanderthal fossils which does indicate a capacity for speech is an enlarged thoracic canal. Fitch (2009, p.129-132) suggests that this enlargement in Neanderthals and modern humans indicates an adaptation to refined vocal control and speech. Although it

is not conclusive that the increase in size of these muscles indicate the use of spoken language, it is a biological prerequisite to have some control over one's breathing to be able to speak.

There are also cultural factors alongside DNA and fossil evidence to further intimate the use of language amongst Neanderthals, such as a progression in stone tool technology. The Neanderthals used a complex technology which evolved from the Acheulean, called the Mousterian (Kuhn, 2014, p.3). As these tools were a progression from the Acheulean, they required more significant skill and practice to produce. As previously discussed, the reproduction of such tools would have likely required some degree of social learning and verbal communication. Additionally, they cooked food and used fire, likely wore a form of clothing and perhaps even used medicinal herbs (Dediu and Levinson, 2013, p.7). All of these factors indicate a more advanced culture in comparison with their predecessors, and in turn indicates more advanced cognition. However, there are counterarguments to this point. It is sometimes argued that something must have rendered Neanderthals inferior to human beings, due to their eventual extinction. A common assumption for this is that they must have been cognitively and linguistically inferior (Berwick and Chomsky, 2016, p.38-39). However, Breyll (2021, p.10-11) proposes a number of reasons, divorced from cognition, to explain why Neanderthals died out. One such reason is attributed to climate, as conditions in Europe would have been harsh. It is suggested that Neanderthals were unable to adapt to these conditions and subsequently died out. There are other factors which may have contributed to their extinction, such as differences in caloric intake. As Neanderthals were bigger than *H. sapiens*, they would have required more food. Thus, a battle for

resources may have also contributed to their demise. Therefore, the extinction of Neanderthals alone is not enough to assert that they were cognitively inferior or of lower intelligence compared with modern humans.

When exploring when language first developed, it is important to consider the function of language, as discerning what its general function is may provide insight as to when this function was first applicable. One theory proposed by Dunbar (2004) is that gossip is one of the primary functions of language. Gossip has a reputation of being hostile, destructive, and ill-natured. It is seen as being counter-productive and damaging towards society and interpersonal relationships. Conversely, Dunbar (2004, p.100) suggests that gossip is at the core of human social relationships and that it underpins the fabric of society. Though it is important to note that he differentiates between gossip with malicious intent and gossip in a broader sense. He ultimately argues that language evolved as a vehicle for bonding large social groups and that gossip, in the sense of exchanging information between social networks, was a key instigator in the advancement of language.

Humans are deeply social beings, a characteristic that we share with primates. In the primate kingdom, the key advantage to being in larger groups is to protect its members from predators (Dunbar, 2004, p.101). Though there is also a disadvantage, such as harassment by more dominant individuals in the group. According to Dunbar, sociality creates a necessity to coordinate an individual's behaviour in the best interest for the group. The primate's solution to this is to create alliances, which are formed through social grooming (2004, p.101). Thus, it is argued that gossip is the modern equivalent of social grooming, and that language replaced grooming as a more effective and efficient

way of bonding large groups. This point emphasises the connection between group sizes and language development. As group sizes increased, language became a social necessity to maintain order.

In addition to increased group size and increased capacity for language, encephalization is another significant component in the evolution of speech and language. Encephalization refers to the increase in brain or neocortex size relative to body size (Lefebvre, 2012). Aiello and Dunbar (1993) theorise that as language became more vital for survival, so did the need for more advanced cognition and subsequently bigger brains. In accordance with this theory, it should allow us to estimate when language began to evolve based on when group sizes and neocortex sizes appeared to increase. When applying this theory to fossil records, it suggests that language, albeit rudimentary, appeared early in the evolution of the Homo genus (Aiello and Dunbar, 1993, p.187), supporting the notion that speech and language can be dated back to the Middle Pleistocene.

A question which relates to the purpose of language is why human beings seem to be the only animal to have developed complex spoken language. Though the question is too big to explore extensively in this essay, Bretas et al (2020, p.5) propose an evolutionary theory which could explain this. They suggest a mode of evolution that deviates from the passive “natural selection” to a more active “triadic niche construction” (2020, p.1). These three niches refer to environmental, cognitive, and neural, and suggests that expanding brain functions have instigated accelerated and drastic changes in hominin ecology, thus demanding further expansion in the brain in order to adapt to environmental changes. They describe it as an “innovation loop” throughout

history, and consider that it was through such an active mode of evolution that language developed (2020, p.5). Assuming it is only humans who have evolved through the form of triadic niche construction, it would explain why we are the only animals to possess the ability for such sophisticated language.

In summary, early emergence theories which attempt to pin-point when language first emerged vary. One reason for this is that such theories favour the possibility that language acquisition was a slow and gradual process which was interwoven with increased group sizes and encephalization. This presents an obstacle in discerning when exactly in our ancestral history we began to use speech and language. However, there is strong evidence to suggest that language predates modern humans. The discovery of the hyoid bone in the 3.3 million year old *A. afarensis* fossil indicates a capacity for limited speech sounds similar to that of a chimpanzee, though the presence of air sacs is presumed to have hindered the range of speech sounds. Fossil remains indicate that the air sacs began to disappear around the time of *H. erectus* who, with the addition of expanding brain growth are theorised to have used some form of proto-language. An advancement in stone tools from Oldowan to Acheulean further supports this as there is a suggested close link between the development of stone tools and language, as verbal communication would have been the most effective way to refine and reproduce tool making skills. Thus, it is hypothesised that alongside evolving culture, group size, and brain size, the Neanderthals and Denisovans used language similarly to modern humans. In terms of why we evolved to use language, it is suggested that gossip, as a form of social bonding, was an instigating factor in the function of language, which supports the correlation between group sizes and the

advancement of spoken language. In closing, evidence presented in this discussion supports the theory that a form of proto-language was used by *H. erectus*, whilst Neanderthals used language most similarly to modern humans. Though the emergence of spoken language cannot be narrowed down to a specific date, it appears probable that it predates modern humans.

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