Could Neanderthals speak?

The Neanderthals were a species of hominids that lived alongside modern humans until they became extinct around 30,000 years ago. Modern humans and the Neanderthals share the same last common ancestor, making them the closest relative to us. More and more archaeological evidence was found, which helped to understand the biological features, behaviour and lifestyle of Neanderthals; linguists, meanwhile, are still finding solid evidence to prove their speech capacity. Unlike bones, teeth or footprints, spoken language is not a physical thing that can be fossilised (Jackendoff, n.d). As a result, scientists have to rely on other types of circumstances evidence such as anatomical adaptations, genetics, environments, behaviours or comparison to modern humans to infer the language and speech capabilities of Neanderthals.

Even so, the question of whether Neanderthals possessed language has been a longstanding and controversial topic among anthropologists and also linguists. Lieberman & Crelin (1971) claimed that Neanderthals lacked the physical features necessary for good articulation, which was later invalidated by Le May (1975). Dediu & Levinson (2013) presented some evidence that Neanderthals and humans were of the same species and that the ability to speak and communicate existed in the common ancestor of Neanderthals and Homo Sapiens. This was disapproved later by Berwick et al. (2013).

This study will assess the previous research findings from various fields to assess the claims that support or refute the language and speech abilities of Neanderthals. The first part of this paper will focus on anatomical evidence, examining fossils and physical remains, such as vocal cord structure, hearing system and brain size. The second part will examine genetic evidence, looking at the genetic markers associated with language. Lastly, the behavioural and cultural evidence will be examined, including artefacts and cultural practices.

Anatomical fossil evidence

The study of the articulatory system in fossil hominins can provide essential insights into the vocal communication system of Neanderthals. Several researchers agreed that the modern human larynx's descent and the hyoid bone's low position are considered evidence of an adaptation for speech (Lieberman, 2007, p.64). The position of the larynx in Neanderthals was also found to be relatively higher in the neck, similar to that of modern human infants but not that of adults, making it harder to produce the same vowel range as humans (Marshall, 1989, p.702). In response to this point, Johansson argues that even so, human children can still produce intelligible speech before their larynx fully descends (2015, p.313). This implies that

the relative position of the larynx plays a less crucial role in speech production rather than a decisive role. The hyoid bone, positioned above the larynx, plays a crucial role in speech production in humans; this feature can provide insight into the vocal tract structures of Neanderthals as it is one factor to consider. The reason is that any movement of the hyoid bone has a direct effect on the positioning and movement of the larynx (Marshall, 1989, p.702). The finding of the Kebara hyoid suggests that cranial base reconstructions are arched as in modern humans and that the Neanderthal vocal tract can produce vowels very similar or identical to those of modern Europe (Frayer, 2017, p.16,17). Nishimura et al. present evidence of the descent of the larynx and hyoid during early infancy in chimpanzees akin to humans, suggesting evolutionary origins in a common ancestor for a non-speech-related purpose and that the descent of the larynx is not unique to humans (2006, p.252).

The study of audition in fossil hominins can provide important insights into the vocal communication system of Neanderthals. Human ears have been suggested to have a sensitivity curve that is different from that of other apes and can perceive sounds in the 2 – 4kHz range (Johannson, 2015, p.317). The range of frequencies that comprise speech and are necessary for comprehension by listeners can be identified using the Occupied Bandwidth (OBW). Conde-Valderde et al. point out that the OBW of Neanderthal vocalisations includes a significant frequency related to consonant sounds and are likely different from the vowel-based communication found in chimpanzees and other mammals (2015, p.610). Furthermore, several studies have examined auditory capacity by comparing the dimensions and functional properties of the middle ears and the ossicle of Neanderthals and early modern humans and have found a large degree of similarity (Johansson, 2015, Quam & Rak, 2008). Stoessel et al. point out that the functional properties of the middle ear in modern humans and Neanderthals are largely comparable, leading even to the suggestion of a shared auditory sensitivity inherited from the last common ancestor (2016, p.11493). The comparable auditory systems between Neanderthals and early modern humans likely lead to the conclusion that Neanderthals possessed the sound perception capabilities necessary to distinguish certain consonants and vowels, which is crucial for the emergence of speech.

The answer to whether the Neanderthals could speak can also be found in brain evidence. Fossil evidence does not provide any clear promise that Neanderthals had language abilities, except indicating that Neanderthals had brains that were larger than average but still in the typical size range for modern humans (Johansson, 2015, p.318). The shape of the Neanderthal brain was more elongated, whereas modern human brains are taller. It notes that

Neanderthal brains were similar in size to modern human brains, but they had a different shape, with a more prominent occipital region and flatter frontal and parietal lobes (Gibson, 1991, p.262). Some researchers suggest that the more rounded shape of modern human brains may be related to a more efficient connection between different regions of the brain and may have played a role in the development of language. Even though similar structures to Broca's and Wernicke's areas can be found in both modern humans and Neanderthals, it is not so promising whether or not Neanderthals can speak since those features can also be found in other non-human primates (Gannon et al. 1998, Johansson, 2015, p.317).

Genetics evidence

Recent advancements in technology and genetic knowledge have led to the identification of a significant number of genetic variations in modern humans that are associated with the development and function of language. In light of this, it is theoretically feasible to investigate the presence and expression of these genes in Neanderthal DNA in order to gain insight into the linguistic capabilities of this extinct hominid species (Johansson, 2014, p.615).

One of the current proofs of their language ability comes from the identification of Neanderthal nuclear DNA and the findings of the 'language gene' FOXP2. It is a gene that has been found linked to specific language impairment (SLI), meaning that it is associated with the production of language, and people with mutations in this gene tend to have difficulties with grammar, syntax, and vocalisation, along with other issues impacting development (Frayer, 2017, p.236). Krause et al. propose that the genetic changes and selective sweep related to the FOXP2 gene took place prior to the emergence of the common ancestor of Homo Sapiens and Neanderthals, which is thought to have existed around 300,000-400,000 years ago. He concludes that the genetic variations connected to FOXP2 existed in the last ancestor and were inherited by their subsequent generations (Krause et al., 2007, p.1909). Additionally, the contribution of FOXP2 to the development of language abilities in modern humans. Maricic et al. (2013), in a recent study, discovered a regulatory substitution of the FOXP2 gene that is present in most present-day human individuals but not found in Neanderthals (cited in Mozzi et al., 2016). However, some researchers doubt that FOXP2 is only one of many genes that contribute to the ability to use language but is related to the externalisation of language rather than being involved in the central control of language (Berwick et al., 2013, p.2). It is important to note that FOXP2 is only one among many genetic factors that are associated with the capability of articulate speech. Additionally, it is crucial to consider the absence of other genes in Neanderthal DNA that are also believed to play a role in language, such as CNTAP2, ASPM,

and MCPH1 (Microcephalin) (ibid). The available evidence suggests that Neanderthals likely had the genetic variations associated with the production of language; however, it is a lack of evidence of whether they have the ability to speak like a modern human.

One of the hypotheses that could change the perception of Neanderthals having language capabilities is the idea of interbreeding between Neanderthals and modern humans. Genetic traces of Neanderthals can be found in 2-4% of the DNA of present-day Europeans (Frayer, 2017, p.236), which raise the question of whether Neanderthals and early modern human interbred and whether they would have needed to have the ability to speak in order to participate in the mating process. The answer to this may remain in the mating behaviours of both of them. The interbreeding between early modern humans and Neanderthals is suggested to happen after the modern humans left Africa, and thus, the population of Homo sapiens involved in the interbreeding had the ability to speak like modern humans do today (Johansson, 2015, p.321). However, for a long-term pair bond in a high hierarchical system such as that of humans, Neanderthals are supposed to develop minimum language ability in order to contribute to the group. Language would not be necessary if the mating can happen with or without consent and any social acceptance. Berwick et al. (2013), in their response to the work of Dediu & Levinson (2013), disputed the notion that Neanderthals and Homo Sapiens were conspecific and presented evidence to the contrary. Specifically, they stated that there is no evidence to support the claim that genetic mixing between the two species led to differences in language abilities. Additionally, Berwick et al. (2013) asserted that anatomical and genetic analyses indicate that both Neanderthals and Homo Sapiens were morphologically and historically distinct entities. Thus, there are some possible implications of the interbreeding between Neanderthals and modern humans, which shed light on the language capacities of Neanderthals.

Behaviour evidence

An examination of the capacity for speech in Neanderthals can be approached by considering the notion that language is a mode of symbolic communication, which is ubiquitous in human interaction. Symbolic thought is considered a defining characteristic of modern human behaviour and is closely linked to the cognitive processes of language, which allows humans to convey meaning, create the abstract concept and convey complex ideas (Deacon 1997). Artefacts that are considered indicative of symbolism in contexts associated with anatomically modern humans are also present in Neanderthal sites, but they occur less frequently, and their significance is not always clear (Johansson, 2014, p.322). There are various indications that demonstrate the kind of reflection and movement made possible

through the use of symbols, such as art or the burial of human corpses, the use of ochre or rituals (Davidson, 2003, p.153-155). Some black, red, and yellow pigments were found in numerous archaeological sites dating back to 200,000 years ago, which suggest the use in the artwork and cultural practices of Neanderthals, such as for body painting (Johansson, 2014, p.322). Concerning the burial rituals, less clear evidence that Neanderthals buried their dead were found. The idea that Neanderthals intentionally buried their dead is still a subject of debate among researchers. Stringer & Gamble (1993) concluded that no Neanderthal skeletal remains had been discovered in an open-air burial setting, while Zilhão reported a Neanderthal tomb that contained an engraved bone and another covered by a stone slab with cup holes or ornaments made of bones, teeth or fossils (2012, p.37,38). Some researchers propose that the burials may have been the result of other factors, such as getting rid of corpses or simply keeping living spaces clean, rather than any symbolic or spiritual significance (Johansson, 2014, p.322). However, the number of Neanderthal remains found with bones still in the correct anatomical position is significantly higher compared to similar remains of cave-dwelling animals (Zilhão, 2012, p.41). This implies that there might have been some sort of ritualistic or spiritual significance associated with the burials of Neanderthal individuals. Those evidence above suggests that Neanderthals had a complex culture and used symbolism in their societies, which is one of the core factors of language emergence.

Conclusion

In conclusion, there is numerous evidence that suggests that Neanderthal possess some sort of language, even though we don't know yet whether it's similar to that of modern humans or whether their language possesses any syntax. The analysis of the articulatory system, audition, and neurolinguistics provides some evidence that Neanderthals had the ability to produce speech but with certain limitations. The position of the larynx in Neanderthals was found to be relatively higher in the neck, similar to that of modern human infants but not that of adults, making it harder to produce the same vowel range as humans, whereas the hyoid bone has been found to be similar in Neanderthals and Homo Sapiens. Studies of the audition have also found a large degree of similarity between Neanderthals and early modern humans, suggesting that Neanderthals possessed the sound perception capabilities necessary for speech. Studies suggest that the genetic variations connected to FOXP2 existed in the common ancestor of both modern humans and Neanderthals and were inherited by their subsequent generations. Additionally, the possibility of interbreeding between Neanderthals and modern humans is a possible explanation for Neanderthals having language capabilities, but there is no conclusive

evidence for this. Symbolic thought is a defining characteristic of modern human behaviour and is closely linked to the cognitive processes of language. Artefacts that are considered indicative of symbolism in contexts associated with anatomically modern humans are also present in Neanderthal sites. The use of pigments, rituals, and the burial of human corpses demonstrate the kind of reflection and movement made possible through the use of symbols. There are indications that they had a complex culture and used symbolism in their societies, which may have been a precursor to the emergence of language. All the above evidence suggests that Neanderthals had some form of spoken language and were not completely without language abilities. However, it is uncertain whether the language abilities of Neanderthals were identical to those of modern humans, and it is possible that they possessed only a subset of such abilities.

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