

What serves as evidence for the presence (or absence) of Pleistocene language?

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Benítez-Burraco & Barceló-Coblijn present some good reasons for showing caution before interpreting evidence for the introgression of DNA from “archaic” human populations, such as Neandertals and Denisovans, into anatomically modern humans (AMH) as evidence for the presence of language in the former. The reasons that I found most cogent are that (1) as we continue to learn more about AMH-specific substitutions we may find important differences in the regions of the genome that affect language, such as those recently reported for a regulatory element of the *FOXP2* gene (Maricic *et al.*, 2013), and (2) that differences between AMH and archaic humans in endocranial developmental trajectories (Gunz *et al.*, 2012) may have affected the “linguistic phenotype” even if all of the populations shared the same underlying “linguistic genotype.”

The target article brings to mind a conversation about Pleistocene hominin language that I had a few years ago over lunch with a friend who happens to be a very good Paleolithic archaeologist. I remember being surprised by his rather matter-of-fact statement that he did not think that Neandertals could speak. It was not his position *per se* that surprised me, but rather how quickly that simple statement exposed how little solid evidence I could summon to support my own opinion that Neandertals probably could speak. Given their fairly large and varied geographic range, stretching from Spain to Siberia, the fact that they were able to deal with “harsh” (at least by Holocene standards)

climatic conditions, that they possessed hyoid bones that look similar to those found in modern humans, and that they seem to have been successful hunters of large game (see d’Errico *et al.*, (2003) for more information on some of these—and other—examples from the archaeological record), I found it reasonable that Neandertals could have spoken to one another in a language not entirely unlike those modern humans use. But that conversation forced me to question to what extent each of those lines of evidence actually serves as “proof” of language in Neandertals. Perhaps it is worth revisiting that exercise here.

Given that archaeologists cannot hope to excavate direct evidence for language in a pre-literate society, culture material can serve only as indirect evidence for the presence of language in Pleistocene hominin populations. Artifacts that may have carried symbolic meaning, including cave paintings, drawings, carved figurines, decorated tools, personal ornaments (e.g., beads made from shell, stone, teeth, or claws), ochre, and pigments, are of particular interest in this context. However, as I am certainly not the first to point out, each of these artifact classes serves as “proof” of the presence of language only to the extent that it requires language. While personal ornamentation may in fact provide an example of a system of non-verbal communication based on symbols, the more important question for us here is: can personal ornaments exist in the absence of a spoken language? If it were possible to make and use beads in the absence of language

—in other words, if language is not a *necessary* condition for personal ornamentation—then the presence of beads in the archaeological record does not serve as sufficient evidence for the presence of language. The same holds for cave paintings, sculptures, decorated tools, and the rest.

Unfortunately, the question of whether language is a necessary condition for personal ornamentation or any of the other items listed above is difficult to answer precisely because we do not currently have a date for the origins of language that has been derived independently of those archaeological proxies. Concluding that decorated tools, for example, serve as evidence for the presence of language while at the same time assuming that language would have been a necessary condition for the ability to decorate tools is not very useful because it assumes the very thing one is trying to explain. The assumption that the ability to decorate tools requires language may indeed be valid, but it requires independent verification.

And yet, perhaps the archaeological record can still be of use in identifying the presence of language. Tomasello (1999) suggests that language is an important pre-condition for cumulative culture in humans. Unlike the examples discussed above, here the artifact need not carry a symbolic meaning to serve as a proxy for the presence of language. Rather, it is assumed that the technological know-how involved in the manufacture and/or use of some types of objects requires the kind of high-fidelity transmission that only language can provide. If this were true, then identifying examples of cumulative culture in the Paleolithic archaeological record may provide a fruitful avenue for studying the origins of language. Unfortunately, identifying cumulative culture in the Paleolithic is not a trivial matter. While some might argue that the first Oldowan stone tools provide hard evidence of cumulative culture, others suggest that it is unclear that even Acheulean technology requires cultural transmission, let alone a sophisticated form of language (Richerson & Boyd, 2005). A more rigorous method for identifying cumulative culture in the Paleolithic record is needed, and some researchers have begun developing one (see Tennie *et al.*, n.d.).

Unfortunately, ambiguity surrounds aspects of the fossil record as well. Is a modern human-like hyoid bone *necessary* for language? The answer to this may very well be “yes.” But is a modern human-like hyoid bone also *sufficient* for language? The answer to this question is “no,” because there are surely other necessary conditions (e.g., cognition) for language in addition to an appropriately shaped and sized hyoid. It is for this reason that the presence of modern human-like hyoids in Neandertals does not necessarily demonstrate the presence of modern human-like language.

This exercise alerts us to the important distinction between evidence for the *presence* of language, evidence for the *absence* of language, and evidence for the *potential* of language. So far, we have discussed the difficulties in demonstrating the presence of language in archaic human populations, but given that there are also difficulties in demonstrating the absence of language, how could my lunch companion be so sure that Neandertals lacked the ability to speak? After all, if I had trouble pinning down evidence *for* language in Neandertals, then what was the evidence *against* it? And here it must be kept in mind that the absence of evidence for language does not necessarily serve as evidence for the absence of language.

I think this is where ancient DNA has the potential to help in ways that archaeological and human paleontological lines of evidence cannot. Namely, aDNA studies could potentially yield positive evidence for the absence of language in archaic humans. Imagine discovering that the language-related regions of every archaic human genome sequenced to date possess ancestral variants that are incompatible with language while the same regions in modern humans are marked by derived substitutions that have been demonstrated to be necessary for human-like language (note that identifying these crucial derived substitutions is currently a work in progress). In this hypothetical case, the lack of the derived variants in the archaic populations could serve as positive evidence for the *absence* of modern human-like language. Confidence in this inference would increase with the size of the sample of Neandertals and Denisovans investigated (as

long as *none* of them showed the derived substitutions found in all modern humans).

I agree with Benítez-Burraco & Barceló-Coblijn that taking the conservative, agnostic stance on language in archaic human populations is prudent at this time, and I would add that this stance is not simply a case of hedging one's bet. The genetic evidence, like the fossil and archaeological evidence, may never provide irrefutable "proof" for the *presence* of language in archaic human populations. At the moment, the majority of the genetic data seem to align with other lines of evidence in suggesting that archaic humans had the *potential* for language. Nevertheless, once we have built a better understanding of the genes underlying language acquisition and use—a tall order, in and of itself—comparisons between AMH and archaic human DNA could potentially yield positive evidence for the *absence* of language in archaic populations in ways that archaeological and human paleontological data cannot.

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