

RECONSTRUCTING THE EVOLUTION OF LANGUAGE:

'EARLY-BLOOMER' VERSUS 'LATE-BLOOMER' THEORIES

Commentary on Bichakjian on Language-Complexity

Thomas Suddendorf
School of Psychology
University of Queensland
Brisbane, Qld 4071
Australia

t.suddendorf@psy.uq.edu.au

Abstract

By investigating historic changes in complexity Bichakjian (1999) tries to convince linguists that languages evolve. Here, I wish to add a reason why speculation about the very origin of language may be a fruitful endeavour. The significance of the question, and increasing archaeological evidence, has resulted in an avalanche of recent proposals. These accounts can be divided into two broad categories; those that advocate either early or late emergence. The "late-bloomer" theories face the likelihood of being disproved by mounting evidence, yet it is precisely for this reason that theories of the evolution of language might gain respectability within the realms of scientific inquiry.

Keywords

complexity, Indo-European, language evolution, lateralization, neoteny, word order.

1. In 1866, the Paris Societe de Linguistique banned any debate about the evolutionary origins of language (Figure 1.). Yet, in recent years theorising about the natural history of human symbolic or representational capacities has increased dramatically. Psychologists and philosophers have proposed diverse accounts on the phylogeny of the human representational mind (e.g., Bickerton, 1995; Corballis, 1991; Corballis & Lea, 1999; Deacon, 1996; Dennett, 1995; Donald, 1991; Lock & Peters, 1996; Noble & Davidson, 1996; Pinker, 1994; Suddendorf & Corballis, 1997 [1]; Suddendorf, 1999). The theories differ in many respects (e.g., emphasis on cognitive, social or ecological factors), but for the present purpose I want to divide them into two broad categories: 'early-bloomers' and 'late-bloomers'.

Figure 1. Paris Linguistic Society Ban on Language-Origins Papers (1866).

<ftp://www.cogsci.soton.ac.uk/pub/psycoloquy/1999.volume.10/Pictures/sud.htm>

2. The early-bloomer theories argue that language began to develop early in hominid evolution, perhaps as early as 5 million years ago (Pinker, 1994). Some 2 million years ago, with *Homo habilis* and *Homo erectus*, there are the first indications, such as stone tools and a marked increase in cranial capacity, which hint at new cognitive

capacities. Furthermore, there is some evidence for the existence of a human-like Brocas area (Holloway, 1996). Moderate versions of this stance hold that representational skills developed gradually over a long stretch of time. These accounts are supported by the fact that there was a progressive increase in brain size over the last 2 million years. Donald (1991) and Corballis (1991), for example, argue that *Homo erectus* might already have had some basic symbolic capacities (mimetic culture) which were progressively exploited in gestural communication. Early gestural communication may then have gradually developed from, as Mike Corballis puts it, 'hand to mouth' leading to vocal language in modern *Homo sapiens* by about 130,000 years ago. The anatomy of the vocal apparatus of these early modern humans suggests that they were capable of speech (Lieberman, 1998). What else would have selected for the modern morphology (a dropped larynx, for example, raises the likelihood of choking)?

3. Yet, there are many proponents of late-bloomer theories who argue that human language evolved rather abruptly in only very recent times. Bickerton (1995), for example, suggests that a single mutation gave sudden rise to syntax. Nobel and Davidson (1996) also argue for a recent advent of language, seeing this as caused not by biological evolution (mutation) but through the accumulating effects of culture. An increased understanding that traces (e.g., footprints) stand for other objects might have gradually led to the conscious use of symbols. While anatomically modern humans roamed the Earth about 130,000 years ago, the first strong evidence that they used symbolic representations (e.g., ornaments, figurines and paintings - 38,000 to 32,000 years old) is the beginning of Palaeolithic art around 40,000 years ago (Bahn, 1996). The earliest incontrovertible evidence for the presence of language, however, is of course only about 5,500 years old (i.e., the first writings). The hiatus between the emergence of anatomically modern humans and the first evidence for symbolic thought has been used to support the claim that modern humans evolved language very recently through social construction (Lock, 1999). Similar arguments have been advanced for other human representational skills. Baron-Cohen (1999), for example, claims that only with the artefacts emerging in the last 40,000 years do we have evidence for a representational theory of mind.

4. It should be pointed out that there are different prospects for late-bloomer and early-bloomer accounts of language evolution. Regardless of the sophistication of each of the late-bloomer theories and, indeed, regardless of whether they are closer to the truth than the early-bloomer theories, only the late-bloomer theories can be, and I may add are likely to be, disproved. For example, the finding of a single clear artefact of symbolic representation confidently dated at, say, 250,000 years ago would shatter the 40,000 year theories. One contender for this position (the Berekhat Ram 'figurine') has already been proposed (Marshack, 1997). However, no find could possibly falsify an early-bloomer theory that, say, postulates that even *Homo erectus* was capable of cave drawings. Absence of evidence is not evidence of absence.

5. One of the main reasons why these theories have emerged in recent years has been an increasing amount of archaeological evidence. However, the crucial aspect of dating these finds is still very difficult. Many theorists, including myself, unquestioningly took the word of archaeologists, and treated the fossil record at reported face value. However, I believe that we are in for a few surprises. Not that I can foresee the future or that I have discovered a new way of dating. Rather, some fossil dating is likely to make errors that underestimate fossil dates, again to the disadvantage of late-bloomer theories.

6. Most of the dating we find in our textbooks is based on the Carbon 14 method (^{14}C). The radioactive isotope ^{14}C is assumed to have been present in a fixed ratio to ^{12}C in the atmosphere. When an organism dies it no longer absorbs ^{14}C and the isotope decays at a constant rate to ^{14}N by beta-emission with a half-life of 5730 years. Calibrating samples against tree rings of known age has improved the accuracy of radiocarbon dating in terms of actual chronological age up to about 6000 years ago. However, the dating of older items becomes increasingly unreliable and is ever more prone to error. After 40,000 years less than one percent of the original ^{14}C remains in the sample and radiocarbon dating becomes nearly impossible.

7. The older the item the greater the chance that there is some form of contamination. Anything would do: some root material, improper handling, or some organic waste transported through underground water. If there is any

contamination with later organic matter it will make the fossil appear to be younger than it actually is by introducing fresh ^{14}C . A 200,000 year-old object could thus erroneously be dated to be 32,000 years old. Note, however, that in limestone caves, for example, more ancient carbon can also be introduced making younger samples appear older. Establishing the past is difficult and research continues to deliver surprises [2]. Given that the extent of classic radiocarbon dating is limited to 40,000 years and that most of the early evidence for symbolic skill has been dated with this method at around the end of its dating capacity, it would not be surprising if better dating methods revealed some older dates. While the age of other items may have been overestimated, these errors would not pose a threat to either late or early-bloomer theories. But a few items that prove to be older than what is currently believed would pose difficulties to the late-bloomer theories.

8. Indeed, there is already some such evidence emerging. Aborigines were thought to have reached Australia some 40,000 years ago. The argument was based on a number of fossil datings pointing to between 32,000 and 38,000 years ago for the oldest finds. Recently, Thorne (1999) re-examined one of these fossils: Mungo 3, the skeleton of a male buried in a grave with red ochre. ^{14}C dating put its age at between 28,000 and 32,000 years old. Thorne used three different methods of dating: Optically stimulated luminescence, electron spin resonance, and uranium decay. All three measures converged on a date between 61,000 and 62,000 years. While this date is still controversial, it could help explain the extinction of megafauna on the Australian continent around that time.

9. If this date holds up, it will have a profound impact on the most extreme late-bloomer theories. Those who argued for a 40,000-year date for the evolution of language will have to explain how this universal human skill reached isolated Australia. Aborigines are fully modern humans with very sophisticated languages. The evolution of language would therefore have to have happened well before they arrived down under (unless one was to propose parallel convergent evolution or cultural transmission from as yet unidentified visitors). In other words, the latest date for late-bloomer theories would have to be somewhere around 70,000 years ago. And there is a good chance that this date will be pushed back further.

10. In contrast to the settlement of Australia, modern humans seem to have reached Europe only around 40,000 years ago (Stringer, 1996). They displaced the local Neanderthal population 35,000 to 30,000 years ago and began to leave the legacy of symbolic artefacts that were part of what came to be known as the Palaeolithic revolution. One new technology associated with this advance is the use of bone for tools. Recently, however, Yellen, Brooks, Cornelissen, Mehlman & Stewart (1995) reported evidence for a much earlier bone industry. Their finds in the former Zaire (Republic of Congo) revealed dates from about 90,000 years ago. Our understanding of prehistory is plagued not only by the difficulty of dating, but also by a bias towards studying the European past. If it is true that modern humans reached Europe only 40,000 years ago, Africa and Asia would be more obvious places to look for early symbolic evidence.

11. The early-bloomer theories will never be surprised by a new find of a Venus figurine that is even younger, but late-bloomer theories will always be threatened by new evidence pushing back the time when something first emerged. Naturally, those theories that argue for the most recent dates are the first to fall victim to such new evidence. More moderate late-bloomer theorists who see transitions at around 100,000 or even 150,000 years ago can feel slightly more secure. But the push into the past continues. Here is one more example.

12. The oldest evidence for hunting with spears used to be about 125,000 years old (a thrusting spear recovered from between the ribs of an elephant), supporting a late-bloomer idea that big game hunting first emerged with modern *Homo sapiens*. Yet, Thieme (1997) recently excavated wooden throwing spears in between deposits of the Elsterian and Saalian glaciations. The well-studied sedimentary sequence at this site suggests that the spears are about 400,000 years old. The spears were found in association with 10 butchered horses, suggesting that there was coordinated and planned big game hunting well before modern *Homo sapiens*. Again, the boundary can be pushed in only one direction. The question is how far back.

13. This sounds like bad news for all those cherished late-bloomer theories. However, it is precisely because they are likely to be falsified that they represent good Popperian science. It may be exactly for this reason that we might choose to disregard the Societe de Linguistiques ban.

FOOTNOTES

[1] Bichakjian 19999 argues that the linguistic invention of tense might have freed our minds from the constraints of the present. In Suddendorf and Corballis (1997) we argue, to the contrary, that mental time travel, the ability to generate the mental experience of past and future, probably preceded the ability to communicate it. The causal relationship between the evolution of these skills is by no means clear. After all, both, language and mental time travel appear to be based on similar attributional, representational, dissociative and generative skills (Suddendorf & Corballis, 1997).

[2] It is worth mentioning here a very recent blow to one of the most influential methods of reconstruction of our common ancestry (i.e., using sequence markers on mitochondrial DNA to trace maternal ancestry). Awadella, Eyre-Walker and Maynard-Smith (1999) have shown that mitochondrial DNA does recombine! Thus, reconstructions pointing to a common ancestor of all humans (a mitochondrial Eve) living less than 200,000 years ago (e.g., Waddell & Penny, 1996) are brought into question. Our common ancestor might well be twice as old (John Maynard Smith, personal communication, 02.12.1999).

REFERENCES

- Awadalla, P., Eyre-Walker, A., & Maynard-Smith, J. (1999). Linkage disequilibrium and recombination in hominid mitochondrial DNA. *Science*, Dec. 24, 2524-2525.
- Bahn, P.G. (1996). Ancient art. In S. Jones, R. Martin, & D. Pilbeam (Eds.), *The Cambridge Encyclopaedia of human evolution* (pp. 361-364). Cambridge University Press.
- Baron-Cohen, S (1999). The evolution of theory of mind. In M.C. Corballis & S.E.G. Lea (Eds.), *The descent of mind* (pp.261-277). London: Oxford University Press.
- Bichakjian, B.H. (1999) Language Evolution and the Complexity Criterion. *PSYCOLOQUY* 10(33).
<ftp://ftp.princeton.edu/pub/harnad/Psycoloquy/1999.volume.10/psyc.99.10.033.language-complexity.1.bichakjian> <http://www.cogsci.soton.ac.uk/cgi/psyc/newpsy?10.033>
- Bickerton, D. (1995). *Language and human behaviour*. Seattle: University of Washington Press
- Corballis, M.C. (1991). *The lopsided ape*. London: Oxford University Press.
- Dennett, D.C. (1995). *Darwin's dangerous idea*. New York: Simon & Schuster.
- Donald, M. (1991). *Origins of the modern mind*. Cambridge: Harvard University Press.
- Holloway, R. (1996). 'Evolution of the human brain.' In A. Lock & C.R. Peters (Eds.), *Handbook of human symbolic evolution*, pp. 74-126. Oxford: Clarendon Press.
- Jackendoff, R. (1999). Possible stages in the evolution of the language capacity. *Trends in Cognitive Sciences*, 3, 272-279.
- Lieberman, P. (1998). *Eve spoke: Human language and human evolution*. New York: W.W. Norton.

- Lock, A. & Peters, C.R. (1996). Handbook of human symbolic evolution. Oxford: Clarendon Press.
- Lock, A. (1999). On the recent origin of symbolically-mediated language and its implications for psychological science. In M.C. Corballis & S.E.G. Lea (Eds.), *The descent of mind* (pp. 324-355). London: Oxford University Press.
- Marshack, A. (1997). The Berekhat Ram Figurine - A late Acheulian carving from the Middle East. *Antiquity*, 37, 357-365.
- Noble, W. and Davidson, I. (1996). *Human evolution, language and mind*. Cambridge University Press.
- Pinker, S. (1994). *The language instinct*. New York: William Morrow & Co.
- Stringer, C.B. (1996). Evolution of early humans. In S. Jones, R. Martin, & D. Pilbeam (Eds.), *The Cambridge Encyclopaedia of human evolution* (pp. 241-251). Cambridge University Press.
- Suddendorf, T. (1999). The rise of the metamind. In M.C. Corballis & S. Lea (Eds.), *The descent of mind* (pp. 218-260). London: Oxford University Press.
- Suddendorf, T., & Corballis, M.C. (1997). Mental time travel and the evolution of the human mind. *Genetic, Social and General Psychology Monographs*, 123, 133-167.
- Thieme, H. (1997). Lower Palaeolithic hunting spears from Germany. *Nature*, 385, 807-810.
- Thorne, A., Grun, R., Mortimer, G., Spooner, N.A., Simpson, J.J., McCulloch, M., Taylor, L., & Curnoe, D. (1999). Australia's oldest human remains: age of the Lake Mungo 3 skeleton. *Journal of Human Evolution*, 36, 591-612.
- Waddell, P.J., & Penny, D. (1996). Evolutionary trees of apes and humans from DNA sequences. In A. Lock & C.R. Peters (Eds.), *Handbook of human symbolic evolution* (pp. 53-73). Oxford: Clarendon Press.
- Yellen, J.E., Brooks, A.S., Cornelissen, E., Mehlma, M.J., and Steward, K. (1995). A middle stone age worked bone industry from Katanda, Upper Semliki Valley, Zaire. *Science*, 268, 553- 556