9th Student Congress of Neuroscience „NeuRi" 2019

Did early *Homo* have language?

Neurocognition behind stone toolmaking

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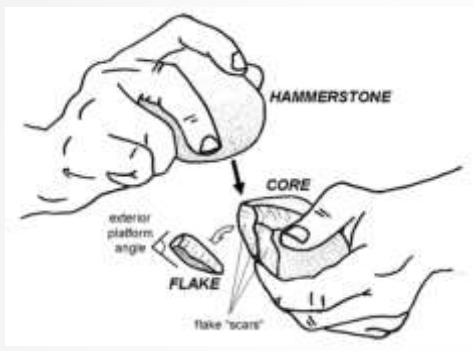
INTRODUCTION

Language is an emergent phenomenon – it is achieved through interaction of various „domain-general" cognitive domains and it is processed in diverse areas of the brain.
It is believed that language evolved via **exaptation** – the reuse of previously existing structures/functions.

One way to study this is to find **neural and neurocognitive correlates of Palaeolithic behaviours**. Due to favourable preservation of stone compared to other materials, **stone toolmaking** is the most intensely researched Palaeolithic behaviour.

OLDOWAN

Dating: from ~2.6 to ~1.42 mya
Hominins: australopithecines, *H. habilis*, early *H. erectus*
Types of artefacts: pebble tools and flakes



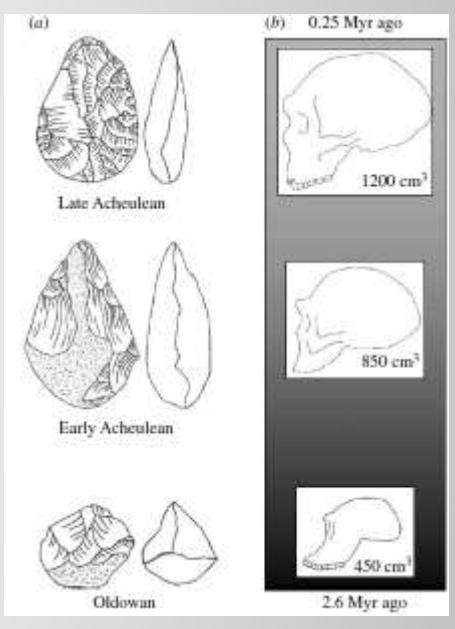
from: Stout & Chaminade (2007)

Trends: increase in body size and modern limb-like proportions, reduction in tooth size and jaw robusticity, planning in raw material management

Oldowan flaking has been described as involving mainly the **frontoparietal sensorimotor areas**, most notably the vPrCG, SMA and IPS, and the **cerebellum** while it is not associated with prefrontal activity.
It relies, therefore, mostly on **motor and visuospatial processing**, with no apparent role of e.g. executive functioning, suggestive of more **„ape-like" cognitive abilities** .

ACHEULEAN

Dating: from ~1.7 mya to ~100 kya
Hominins: *H. erectus*, *H. heidelbergensis*
Types of artifacts: handaxes, retouched flakes etc.
Trends: increase in brain size, evidence of functional lateralisation, control of fire, „symbolic" behaviour



from: Stout et al. (2008)

Higher activation during Acheulean handaxe manufacture relative to Oldowan flaking was found **bilaterally in the vPMC, inferior parietal areas, right Broca's area and bilaterally in the temporal areas** .
Gabrić et al. (in preparation) studied the **neurocognitive correlates of sidescraper** manufacture. Compared to the Oldowan chopper manufacture it showed to have **higher visuospatial and executive demands**.

CONCLUSIONS

It seems that Oldowan cognition shows more resemblance to the earliest hominins and australopithecines than to modern humans.
While it is hard to say whether Acheulean hominins had language, data suggests that **some crucial aspects of modern human cognition might have been in place in the Acheulean, more probably from later Acheulean**. This might imply that the cognitive prerequisites for language had been met during that time.

Behavioural escalation during the Acheulean suggests that more **enhanced modes of communication**, not necessarily linguistic communication, were appearing.
Language in Oldowan populations seems unlikely.
Much more empirical research is needed to clarify these issues and **escape the speculative inferring** which has plagued much of the research on the evolution of cognition and language.

REFERENCES: See handout