

Tool Use, Taxonomy

Monday, October 4, 2021 11:12 AM

Culture and Tool Use

hammerstones → flakes
2.6 mya
hand axes
1.4 mya
300k-250k

Oldowan → Early Acheulian → Late Acheulian
A. Africanus H. erectus H. Heidelbergensis
A. garhi

Primary difference between humans / other species: tools are manufactured
(use tools to make tools)

Neural Cost of Tool Making

- understand goal
- quickly learned, easily taught } step 1
- Late Acheulean tools: symmetrical, bifacial
→ 10-20 yrs. to learn skill

• human brain reached modern shape/size about 100,000 yrs. ago
(reactive to increasing tool use)

→ evidence for handedness (characteristic flake patterns).

Human brains are highly asymmetric

- bulges (petalia) in left occipital, right frontal lobes not seen in great apes
- split-brain experiments
- lateralized nervous systems present in many animals (mollusks, sharks, fish...)
↳ reason: brain tissue expensive; don't want to duplicate function.

Also allows for optimization

examples: pigeons detecting small objects, chimps w/ handedness → better termite catchers,
parrots w/ handedness in foot → string pulling

At the population level, coordination / same-handedness in group helps with
fast communication + escape from predators

- behavior is more symmetrical in great apes vs humans -
- rather than population-level handedness (e.g. 90% RH), apes have task-dependent handedness
- apes in captivity seem to emulate human handedness more

The Action Brain Circuit

Human ability to reason ("how" pathway) increased

↳ superior parietal lobe

↳ foundation for left-hemisphere language processing

Hierarchical Planning

reminder: human tool use is not unique!

- ↳ chimps use stone hammers (nuts), fishing rods (termites), leaf sponges (tree holes), spears (bush babies)
- ↳ New Caledonian Crow: makes fishing hooks from leaves
- ↳ octopus uses coconut shells for hunting + protection

Two cognitive domains for tool use:

1. Planning (multiple interdependent steps + motivation)

2. Sensori-motor coordination (precise grips, blows)

↳ Ethiopian Konso society: women specialize in fine motor skills + tool making

Review: Taxonomy

- Domain (most broad) -> bacteria, archaea (no cell nuclei), eukaryotes
- Kingdom -> plants, animals
- Phylum -> chordate
- Class
- Order
- Family
- Genus
- Species

- Humans:
- Eukaryota
- Animalia
- Chordata
- Mammalia
- Primates
- Hominidae
- Homo
- Sapiens



