

Midwives and the birth of language



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Talk is cheap.

Signal evolution theory says it should be expensive.

This has been discussed at length already, with various proposed solutions. Not going to review all of them here.

Main contender is human prosociality.

Compared with other apes, humans are:

- remarkably helpful and cooperative,
- remarkably trusting, and
- remarkably restrained,

in their social interactions, even with strangers.

A group of children, mostly wearing bright yellow safety vests, are walking across a wet, reflective pavement. They are accompanied by several adults, some in dark winter clothing and others in more colorful gear. The background shows a waterfront area with a bridge and buildings under an overcast sky. The scene suggests a school or organized group activity in a public space.

Humans are so trusting that we trust comparative strangers even with our kids.

No sane chimp would leave their offspring at preschool, but I do it every day 😊.

Humans are trusting and helpful.

Both trust and altruism are evolutionary oddities.

Trust and altruism together explain how language can be cheap – but how can trust and altruism be explained?

- Kin selection? Works fine, but does not explain helping strangers.
- Group selection? Requires anti-cheating measures or special conditions. Does not explain helping non-group-members.
- Reciprocal altruism? Works in principle, but rare in nature. Does not explain helping strangers.

None of these will work on its own.

Fossil and archaeological proxies for cooperation and trust?

Even sociality is non-trivial to document in prehistoric times.

But one major transition in human evolution is both fossilizable and a good proxy for cooperation and trust – birth assistance! (cf. Hrdy 2011)

The evolution of birth assistance

Chimps give birth alone, actively hiding from the group. Works fine for them.
Humans give birth surrounded by helpers. Works fine for us.

Why so different?

Two sides:

- Evolutionary pressures conspiring to increase the need for help.
- Changes in group structure and family structure facilitating help.

Evolutionary pressures conspiring to increase the need for help.

- Upright walking, changing the structure of the pelvis.
 - Narrower birth canal.
- Increased brain size.
 - Bigger baby head to push through the narrower birth canal.
 - Bigger despite alleviation by changing brain growth pattern.
- Less climbing, arms get shorter and weaker.
 - Much easier for a chimp than for a human to be her own midwife.

All these are visible in fossils.

Bottom line:

Homo erectus needed midwives,
but habilines didn't.

Group and family structure

Chimps give birth alone, actively hiding from the group.

Why do they actively hide? Because good reason not to trust!

Infanticide very common. Infants must be guarded 24/7.

Humans give birth surrounded by helpers.

Why do we accept help? Traditionally, helpers are kin.

Differences in family and group structure makes kin available for humans but not for female chimps.

Kin selection makes birth assistance a low-threshold entry to trust and helpfulness – low cost for grandma, high value for grandchild.

Cooperative breeding

Without birth assistance, human evolution would grind to a halt at *habilis*.
With birth assistance, we could grow human bodies and brains.

Next step:

From birth assistance, it is a small step to further childcare assistance.
Same people involved, same evolutionary factors, but lower stakes.
Help with childcare enables shorter birth intervals.

Bottom line:

The effective fecundity of humans "in the wild" is twice that of other apes.
That's why there are billions of humans and thousands of chimps...

Prosociality beyond kin

With cooperative breeding, there is room for a widening circle of helpers:

- More and more distant relatives.
 - Requires gradually increasing level of trust.
- Reciprocal with other parents.
 - You watch my kid while I hunt, I do the same for you tomorrow.
 - Requires substantial trust.
 - Requires communication.
- Group level, after building mutual trust through reciprocity.
 - Trust can be maintained only if cheaters are kept out.
 - Reputation strong tool for cheater detection – learn from mistakes of others.
 - But how would reputation work without language?

High-fidelity social learning

(Cory's thesis 😊)

- Requires helpfulness & prosociality.
 - Chimps don't bother to teach.
- Requires basic theory of mind.
- Is required for language.
 - Requires language? Stimulates language?
- Archaeologically shown by handaxes!

Bottom line:

Hi-fi social learning started with *erectus*.

Feedback loops in a virtuous circle

Several mutually reinforcing developments:

- Cooperative breeding requires prosociality.
 - Major darwinian advantage when up and running.
- Prosociality requires trust.
- Beyond kin, trust requires social control.
- Social control much facilitated by language.
 - Judge others not only by what you witness yourself.
 - Reputation, gossip, social capital...
- Social control much facilitated by social learning.
 - Learn how to behave.
 - Learn about others, learn who to trust.
- Social learning much facilitated by language.
- Language requires prosociality & social learning.

Midwives bootstrap the circle, getting it off the ground!

Demographic liftoff in humans

The whole package from the loop provides major increase in fecundity, and should produce a population explosion.

Three clear demographic jumps in human history:

- *Homo erectus*. Habiline fossils are few and limited to Africa. But *erectus* spread and filled up the Old World in no time flat.
- *Homo sapiens*. Spread out of Africa and swamped the resident neanderthals and hobbits and other *erectus* descendants, and went beyond to new habitats.
- Agriculture. The neolithic revolution enabled much larger population densities, paving the way for the modern world.

The need for birth assistance was there already in *erectus*, and language was in place well before *Homo sapiens* spread out of Africa.

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Human prosociality loop gave rise to **first** liftoff.

Later liftoffs had other causes.

Feedback loops in a virtuous circle

- Bootstrapped by midwives.
- But whole circle gets off the ground together, once it is started.
- Fossil or archaeological proxies for one link in the circle are fossil proxies for all!
 - Fossil proxy for assisted birth present in *erectus*
 - Fossil proxy for hi-fi social learning present in *erectus*
 - Demographic liftoff in *erectus*

Three links in the loop present in *erectus*



Language present in *erectus*

An *erectus* midwife brought
language safely into the world.

