



# Modern Human Origins

## Interfaces with Archaeology and Genetics

Hugo Reyes-Centeno, Yonatan Sahle, Christian Bentz

21 January 2019, Lecture 10, Bentz



## Readings for Lecture 10

Albessard-Ball, Lou, and Antoine Balzeau. 2018. Of tongues and men: A review of morphological evidence for the evolution of language. *Journal of Language Evolution* 3 (1): 79-89.

Morgan TJH, Uomini NT, Rendell LE, Chouinard-Thuly L, Street SE, Lewis HM, Cross CP, Evans C, Kearney R, de la Torre I et al. 2015. Experimental evidence for the co-evolution of hominin tool-making teaching and language. *Nature Communications* 6: 6029.

Pagel, Mark. 2017. Darwinian perspectives on the evolution of human languages. *Psychonomic Bulletin & Review* 24: 151-157.

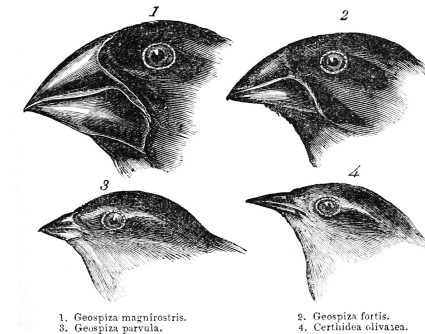


# Recap of Lecture 9

Preadaptations to Language

# Terminology

- Adaptation
- Preadaptation
- Exaptation
- Spandrel



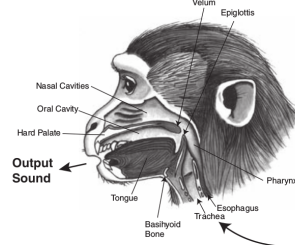
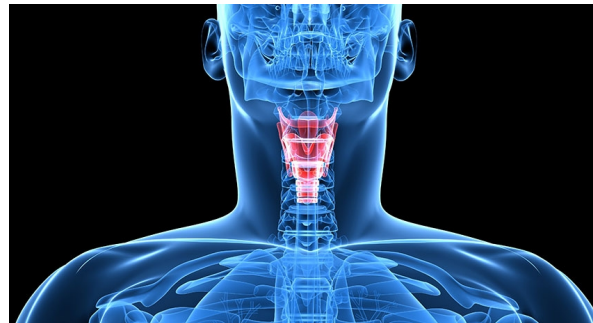
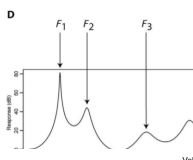
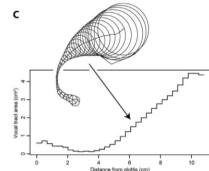
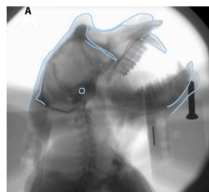
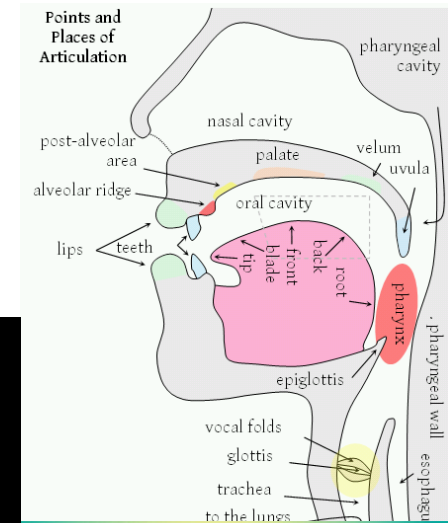
Fitch 2010, p. 63-64



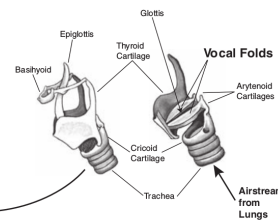
# Summary: Speech Production and Perception

According to Fitch there is no strong evidence that the vocal tract anatomy and perceptual abilities of animals – **the hardware** – prevents them from using speech.

The difference is more likely in the **software**.



A. Filter: Vocal Tract



B. Source: Larynx





# Stone Tool Production and Language

- Theory
- Experiments

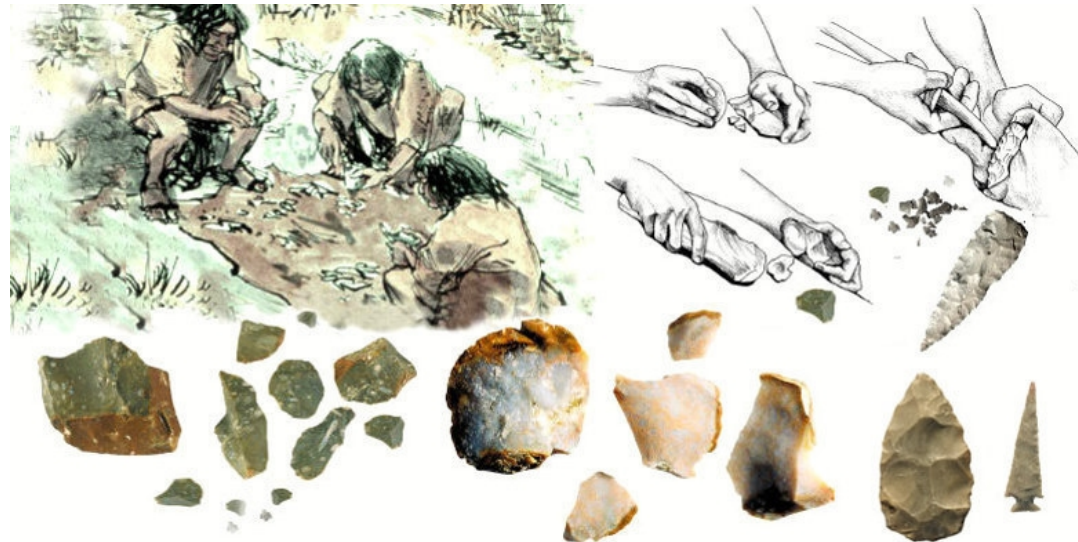
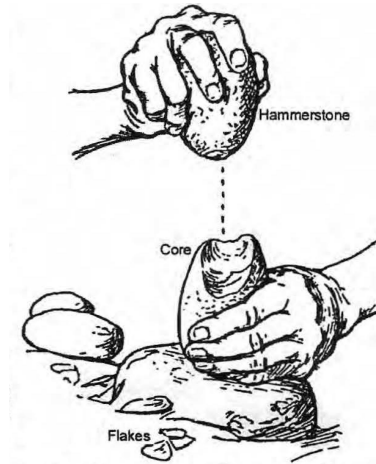
# Stone Tools & Language

## Theory

- Hierarchy
- Thinking tools

## Experiments

- Oldowan
- Acheulean
- Levallois



# Stone Tools & Language

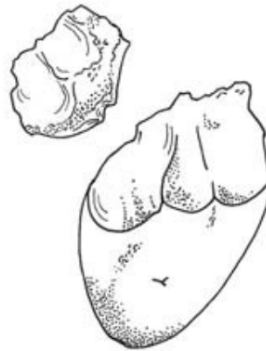
## Theory

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## Experiments

- Oldowan
- Acheulean
- Levallois

Mode 1:  
Oldowan



All-Purpose "Chopper" and Flake  
Australopithecines

Mode 2:  
Acheulean



Hand-Axe  
*Homo erectus*

Mode 3:  
Levallois



Spear-Point  
Neanderthals

Mode 4:  
Solutrean



Thin, Sharp Blade  
Modern *Homo sapiens*

Fitch (2010), p. 256

**However...** remember that it is generally difficult to assign particular technologies to different times and hominins (lectures by Dr. Sahle)



# Stone Tools & Language

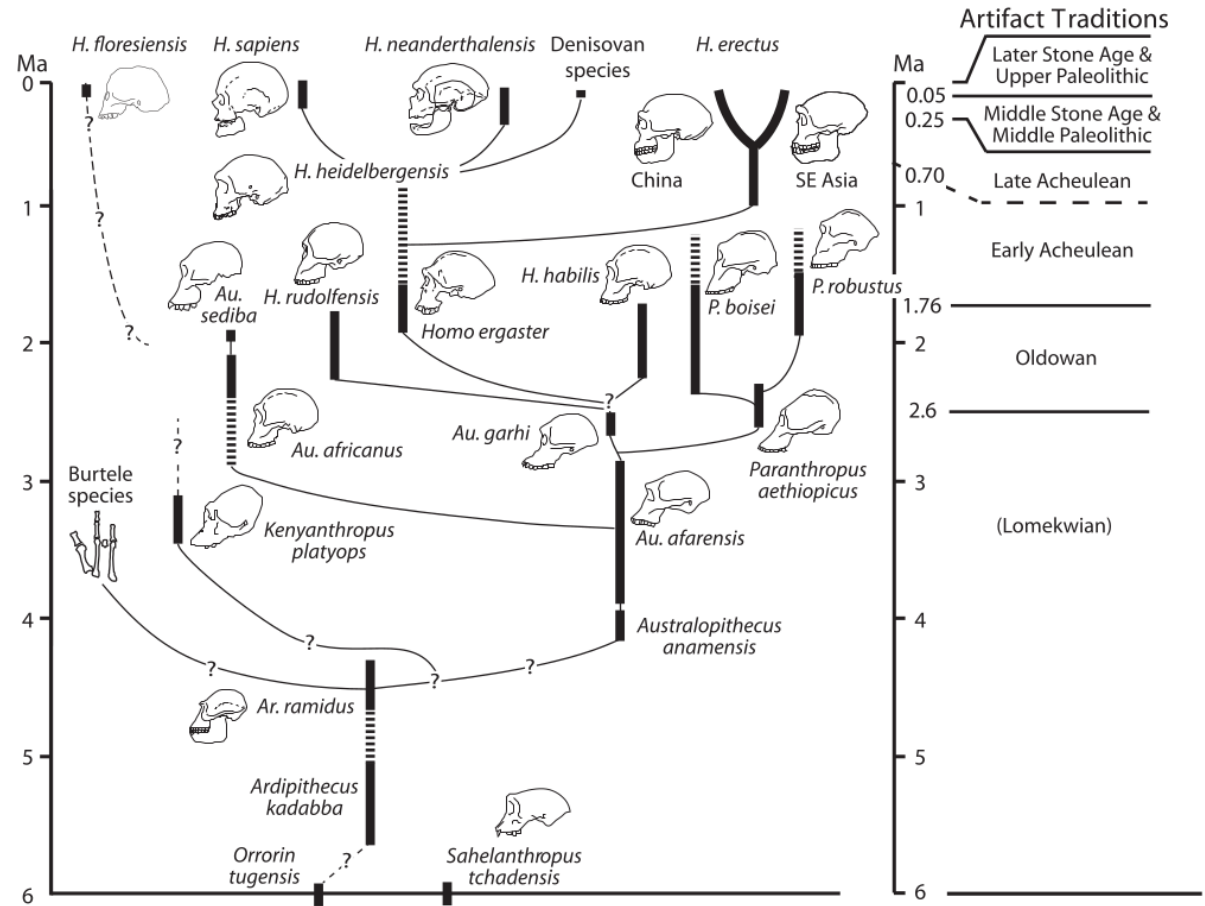
A more fine-grained view

## Theory

- Hierarchy
- Thinking tools

## Experiments

- Oldowan
- Acheulean
- Levallois



Klein (2017). Language and human evolution.





# Stone Tools & Language

## Theory

### - Hierarchy

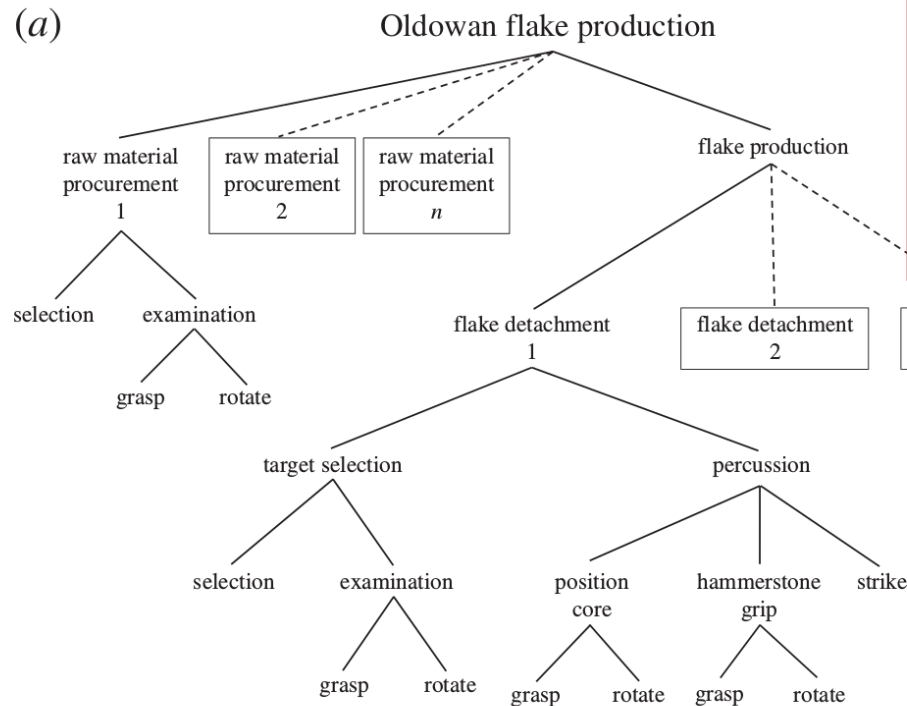
### - Thinking tools

## Experiments

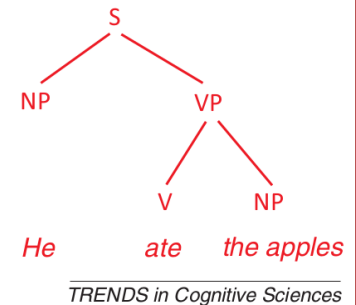
### - Oldowan

### - Acheulean

### - Levallois



### (c) Natural language



Within this structure, certain discrete **action ‘chunks’ can be repeated an indefinite number of times**, as indicated by numbers 1, 2, . . . , n. [...]

Such modular structure is an efficient and productive characteristic of hierarchical organization that has received much attention in the study of language under the heading of ‘discrete infinity’

Stout (2011). Stone toolmaking and the evolution of human culture and cognition.



# Stone Tools & Language

Tool use in our closest living relatives:

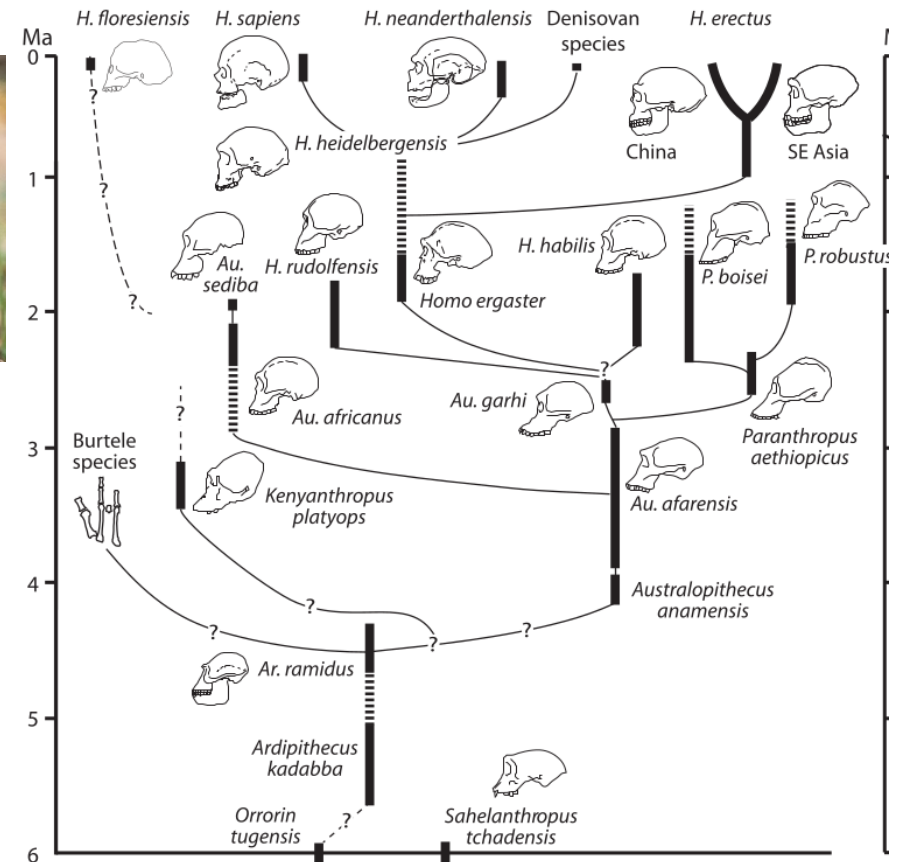


## Theory

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# Video

<https://www.youtube.com/watch?v=o2TBicMRLtA>



## Stone Tools & Language

### Theory

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## Example: Fishing for termites



### Cognigrams Reflecting action steps and attention foci

0. Perception of basic need: feeding
- 0a. Perception of sub-problem 1: open termite nest / extract termites
- 0b. Perception sub-problem 2: tool necessary to open nest
- 0c. Perception of sub-problem 3: tool necessary for probing

#### PHASE I: manufacture of probe I

1. Search for appropriate twig

#### PHASE II: manufacture of probe II

2. Detaching the twig
3. Shortening / removal of leaves / fraying of brushtip

#### PHASE III: transport of probe

4. Transport of probe to termite nest

#### PHASE IV: search for chisel

5. Selection of chisel on site

#### PHASE V: opening the termite nest

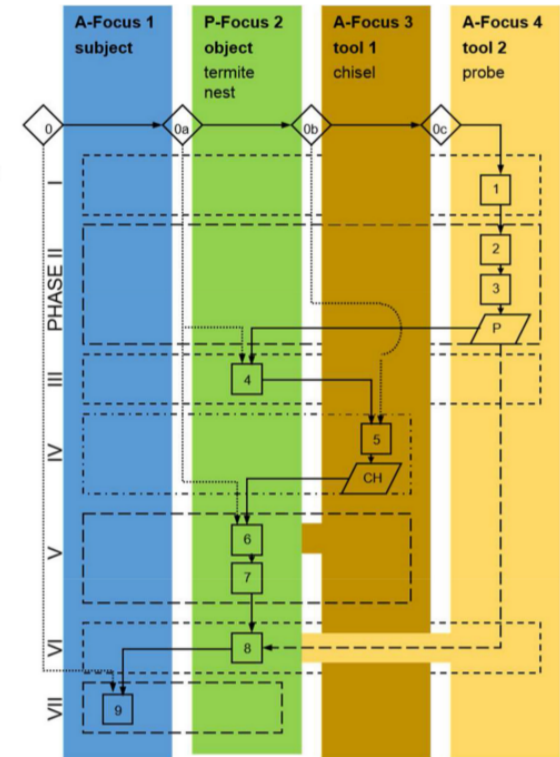
6. Pushing with chisel (several times)
7. Inspection of chisel

#### PHASE VI: probing for termites

8. Extraction of termites with probe

#### PHASE VII: satisfaction of need

9. Consumption



Haidle (2014). Building a bridge – an archaeologist's perspective on the evolution of causal cognition.





# Stone Tool Production and Language

- Theory
- **Experiments**

## Stone Tools & Language

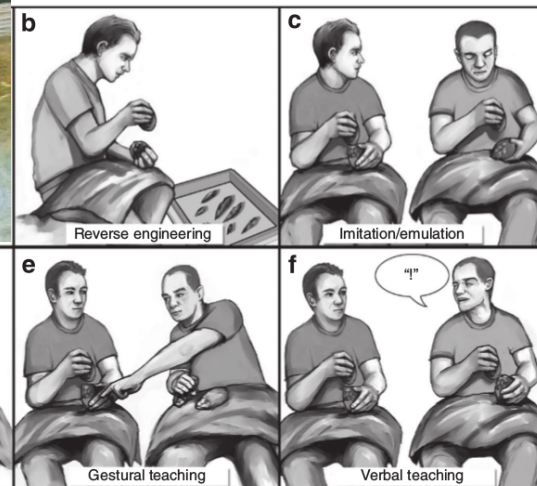
How much gesture and speech do we need to transmit knowledge about stone tool making?

### Theory

- Hierarchy
- Thinking tools

### Experiments

- Oldowan
- Acheulean
- Levallois





# Stone Tools & Language

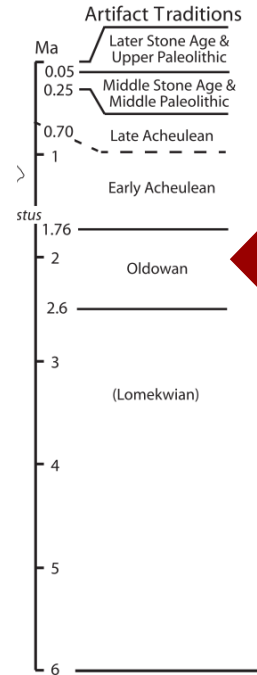
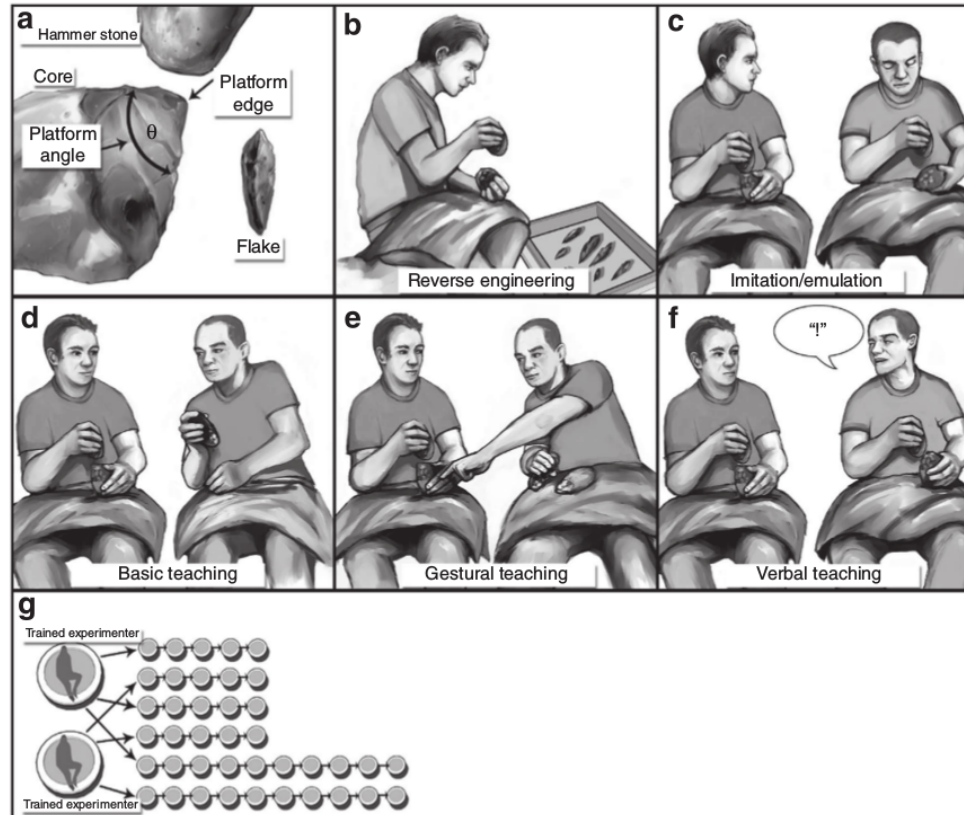
## Theory

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## Experiments

- Oldowan
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## Learning and transmission of Oldowan technology



Morgan et al. (2015). Experimental evidence for the co-evolution of hominin tool-making teaching and language.



# Stone Tools & Language

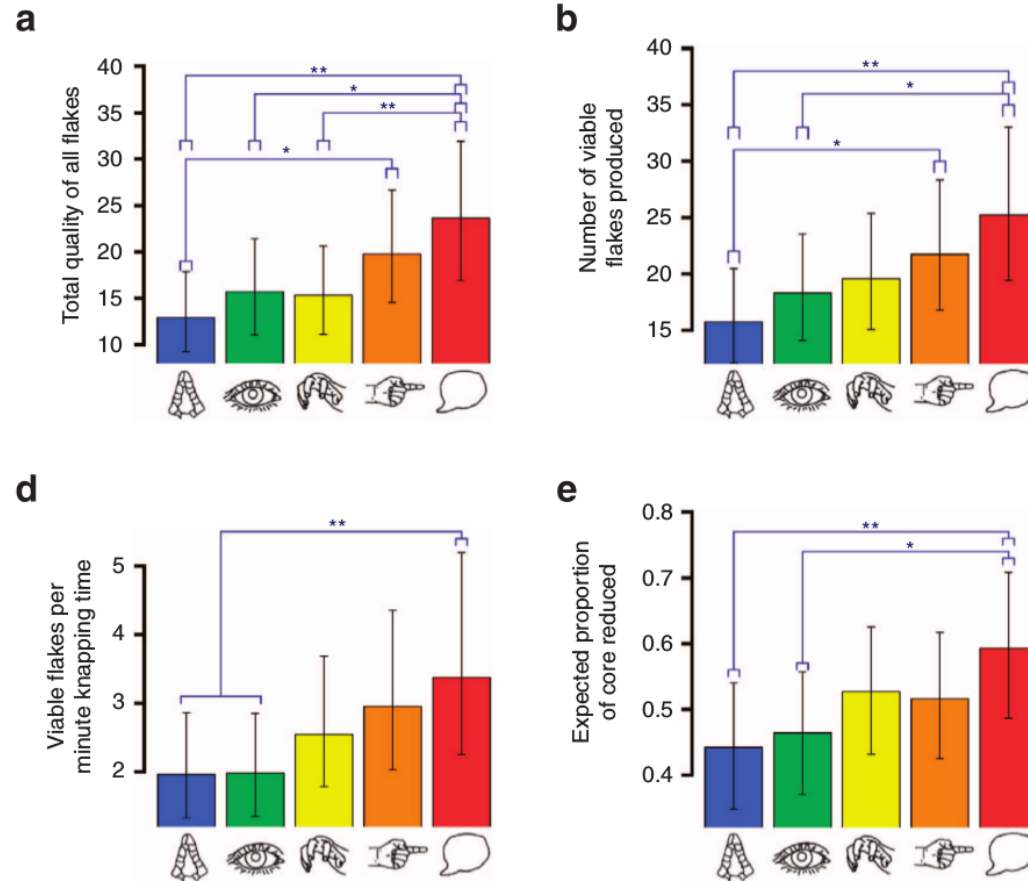
## Theory

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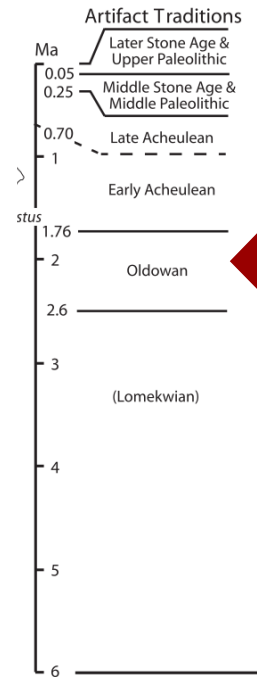
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Morgan et al. (2015).





## Stone Tools & Language

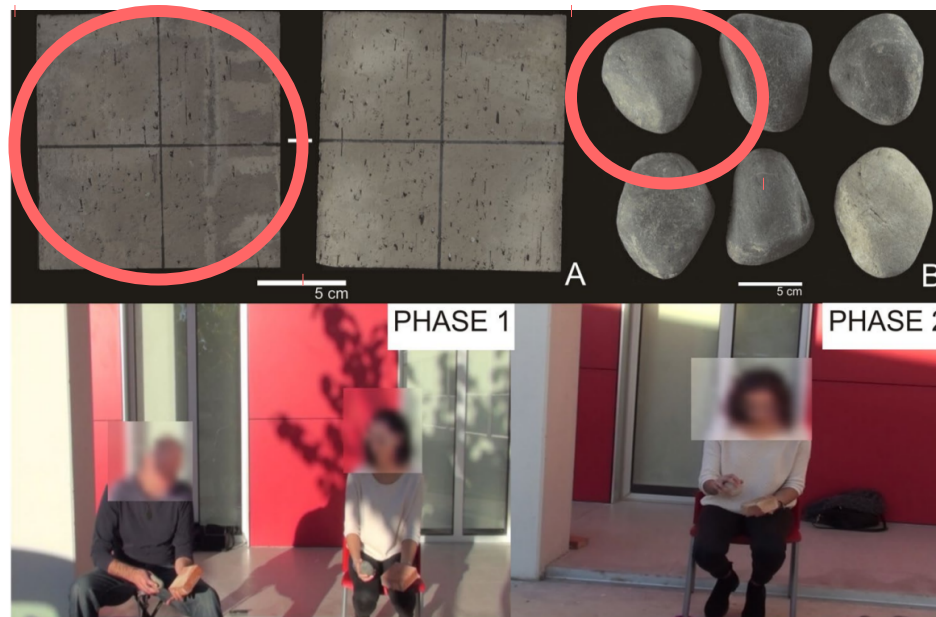
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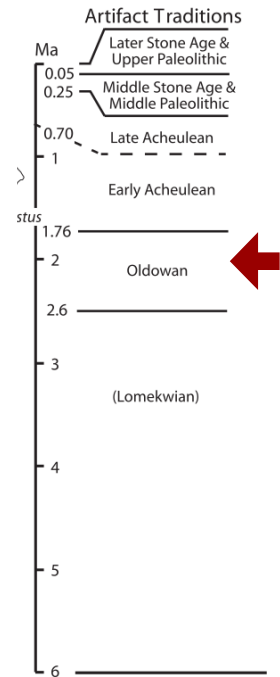
## Learning and transmission of Oldowan technology



**Figure 6.** (A) Brick used as a blank, (B) set of hammerstones used in the experiment. Phase 1: expert knapper and an apprentice knapping; Phase 2: apprentice knapping alone.

Same blanks and hammerstones for all participants.

Lombao et al. (2017). Teaching to make stone tools: new experimental evidence supporting a technological hypothesis for the origins of language.





# Stone Tools & Language

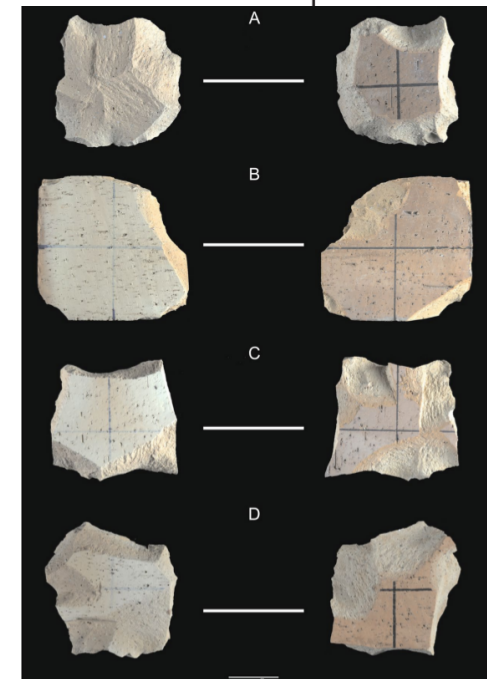
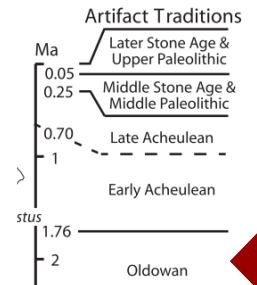
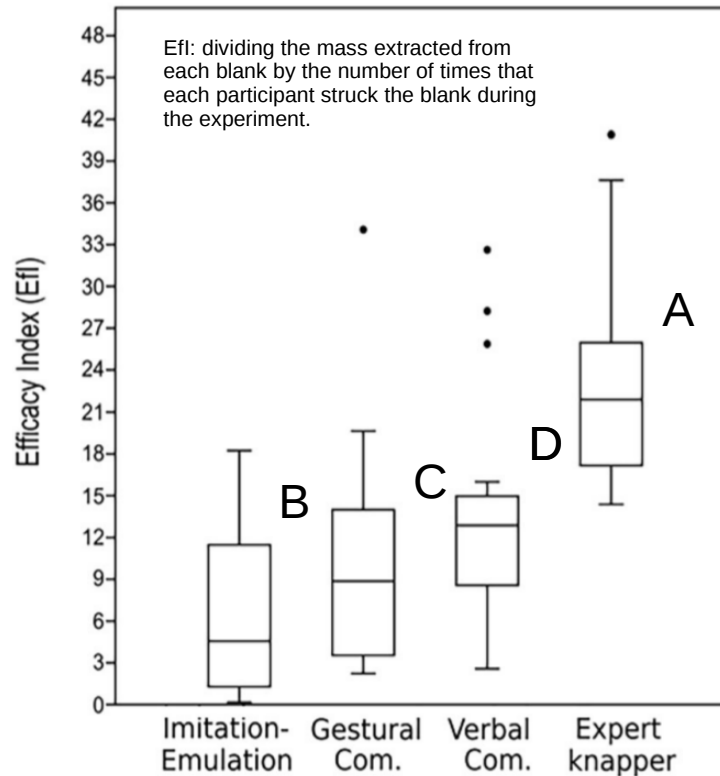
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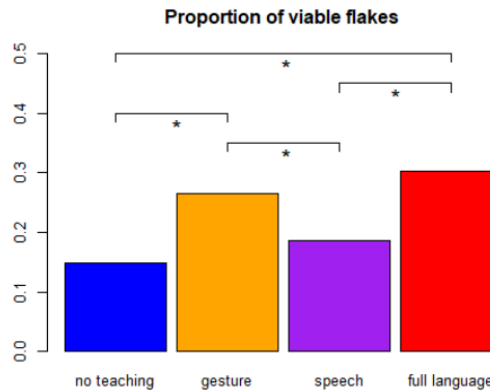
### Theory

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- Thinking tools

### Experiments

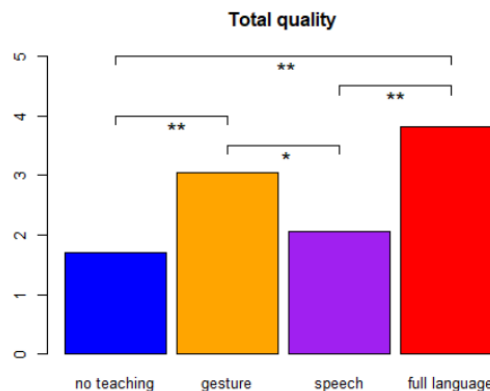
- Oldowan
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## Most recent paper: Learning and transmission of Oldowan technology

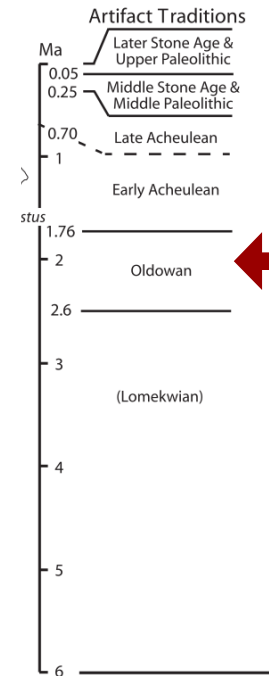


**Speech (on its own)** is an ineffective method of transmission of Oldowan-style tool-making skills, i.e. not significantly better than no teaching at all (!)

**Full language (gesture+speech)** is most efficient, but not significantly better than gesture alone (!)



Cataldo et al. (2018). Speech, stone tool-making and the evolution of language.



# Stone Tools & Language

## Theory

- Hierarchy
- Thinking tools

## Experiments

- Oldowan
- **Acheulean**
- Levallois

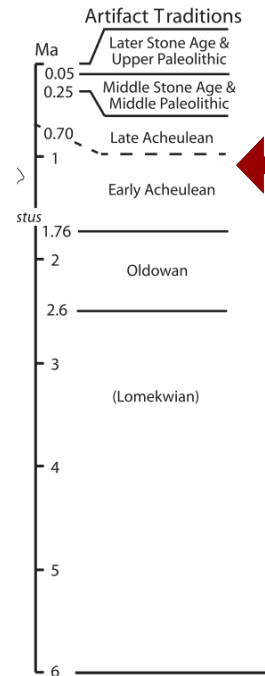
## Learning and transmission of bifacial (Acheulean) technology



Instructor



Putt et al. (2014). The role of verbal interaction during experimental bifacial stone tool manufacture.



Students (Quality score between 1-4)



## Stone Tools & Language

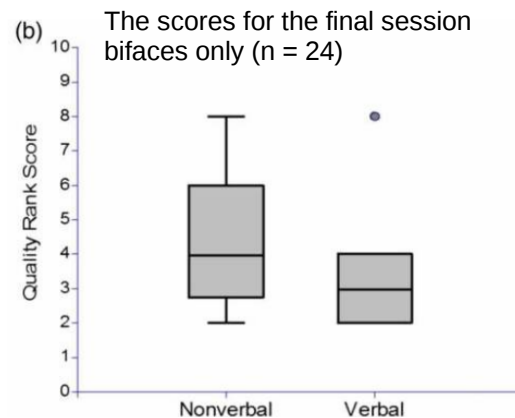
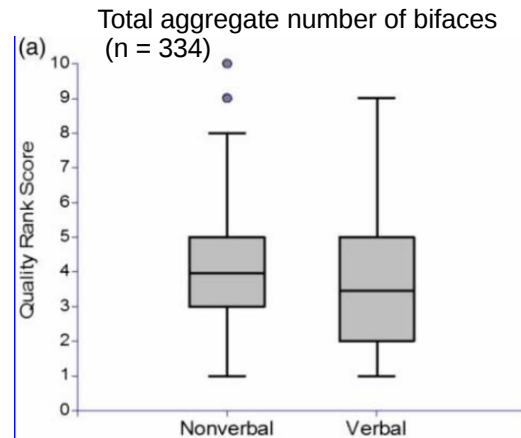
### Theory

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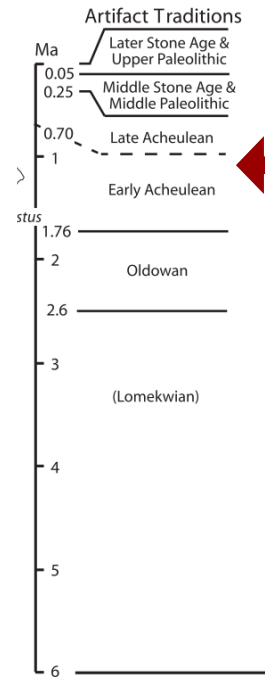
### Experiments

- Oldowan
- **Acheulean**
- Levallois

## Learning and transmission of bifacial (Acheulean) technology



“These results indicate that **verbal interaction is not a necessary component** of the transmission of the overall shape, form, and symmetry of a biface in modern human novice subjects, and it **can hinder the progress of verbal learners** because of their tendency to over-imitate actions of the instructor that exceed their current skill set.”



Putt et al. (2014). The role of verbal interaction during experimental bifacial stone tool manufacture.



# Stone Tools & Language

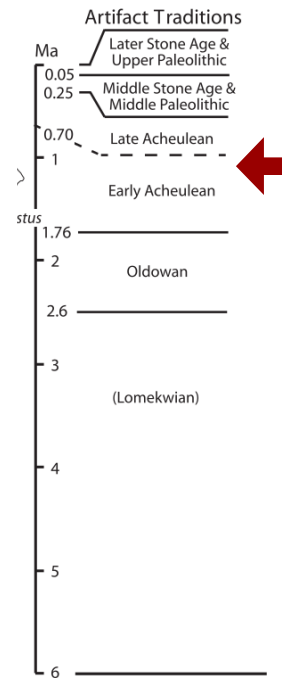
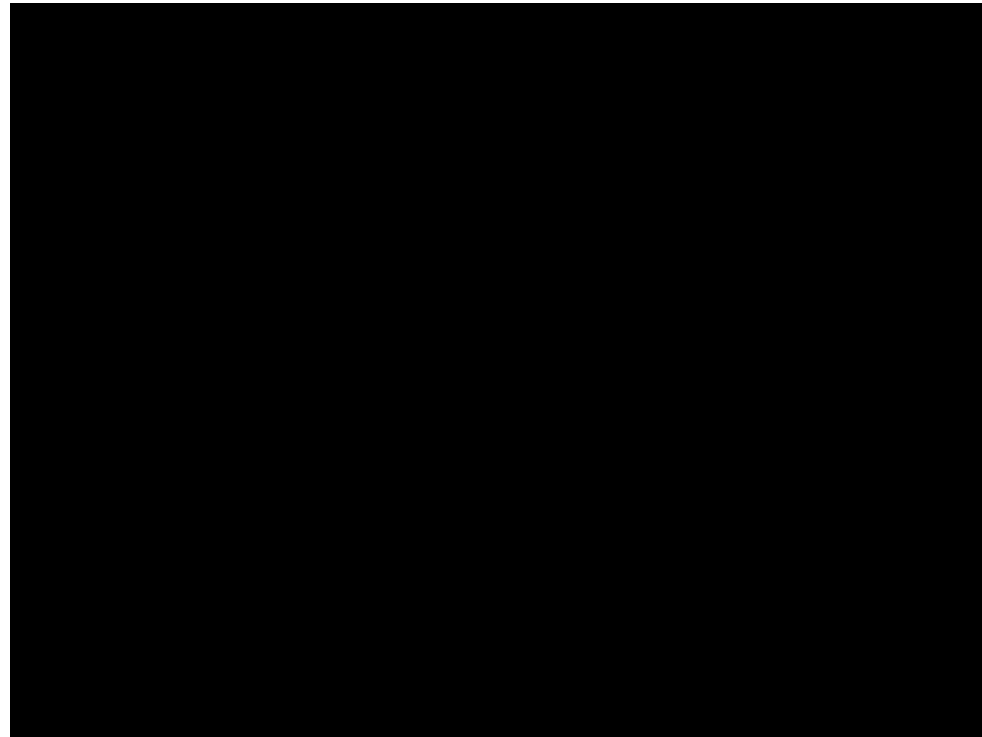
Shared neural substrates for stone tool-making (planning of Acheulean) and language (word production)

## Theory

- Hierarchy
- Thinking tools

## Experiments

- Oldowan
- **Acheulean**
- Levallois



Uomini & Meyer (2013). Shared brain lateralization patterns in language and Acheulean stone tool production: A functional transcranial doppler ultrasound study.



# Stone Tools & Language

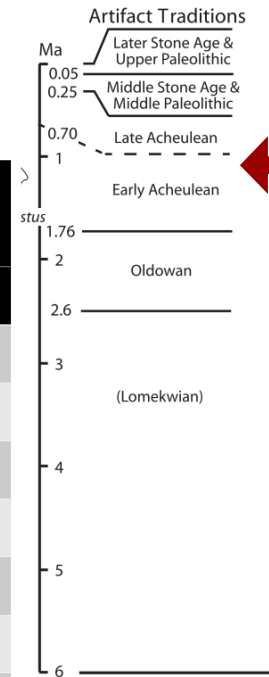
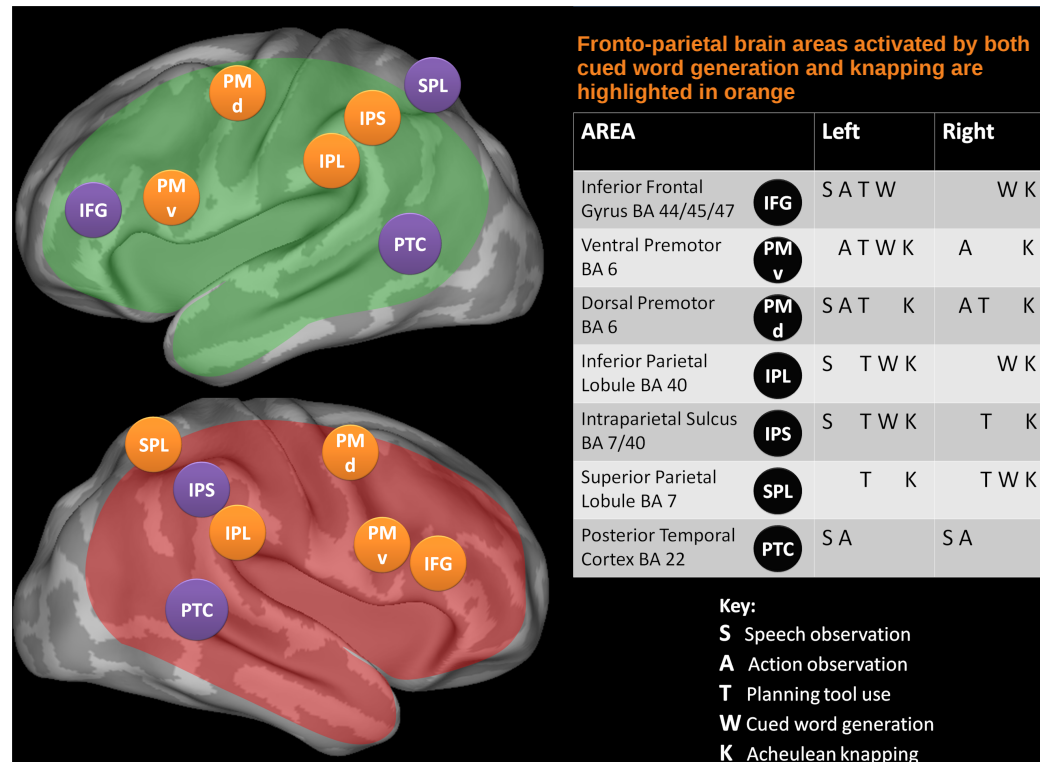
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# Stone Tools & Language

## Theory

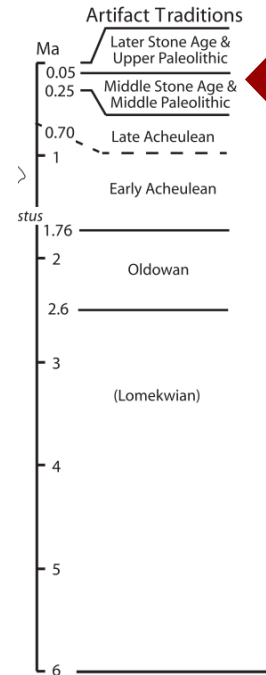
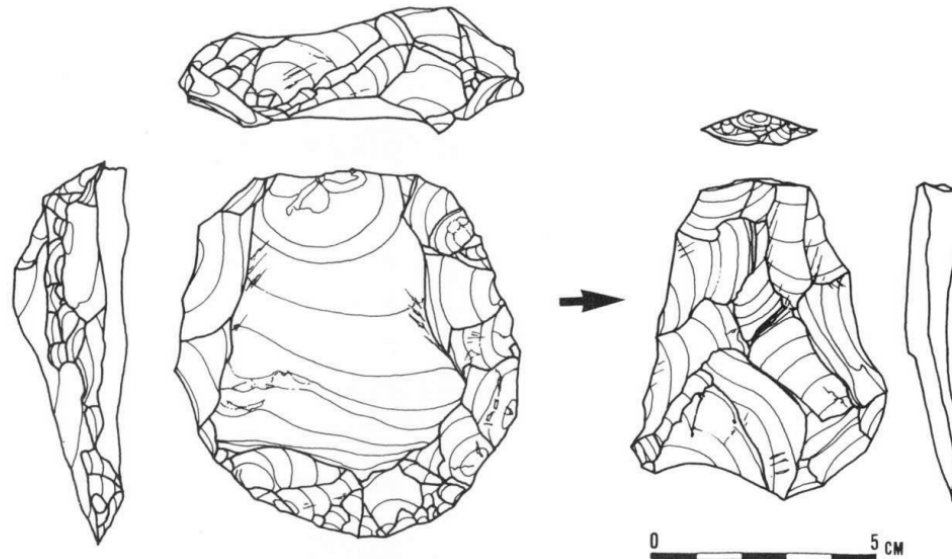
- Hierarchy
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## Experiments

- Oldowan
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## Learning and transmission of Levallois technology

### Demonstrator



Ohnuma al. (1997). Transmission of tool-making through verbal and non-verbal communication: preliminary experiments in Levallois flake production.

# Stone Tools & Language

## Theory

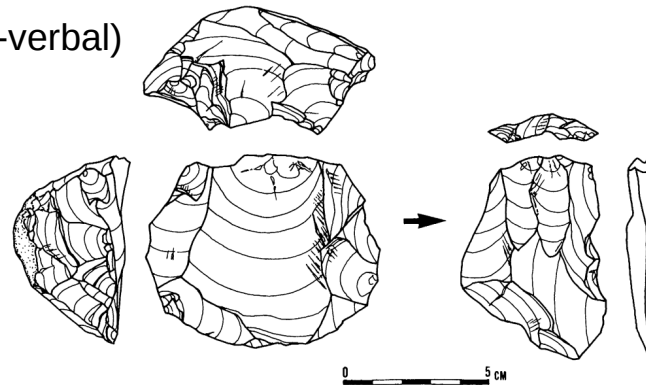
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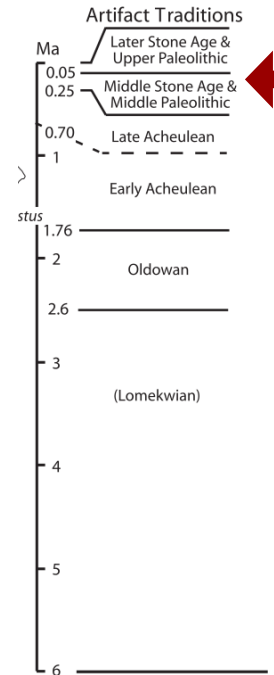
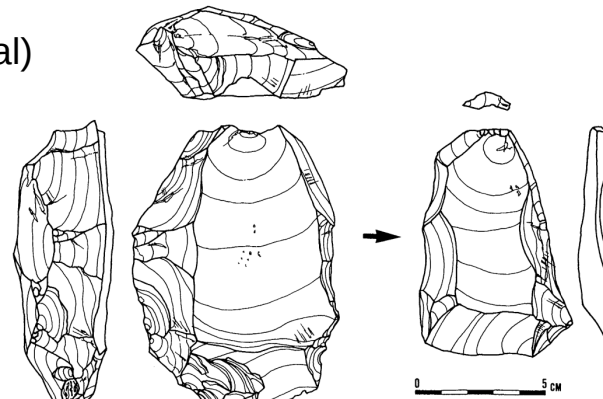
- Oldowan
- Acheulean
- **Levallois**

## Learning and transmission of Levallois technology

Student (non-verbal)



Student (verbal)



Ohnuma al. (1997). Transmission of tool-making through verbal and non-verbal communication: preliminary experiments in Levallois flake production.



## Stone Tools & Language

### Theory

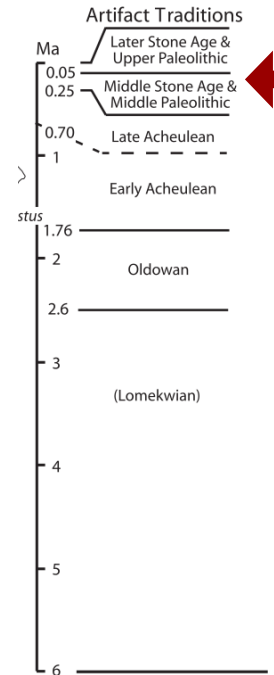
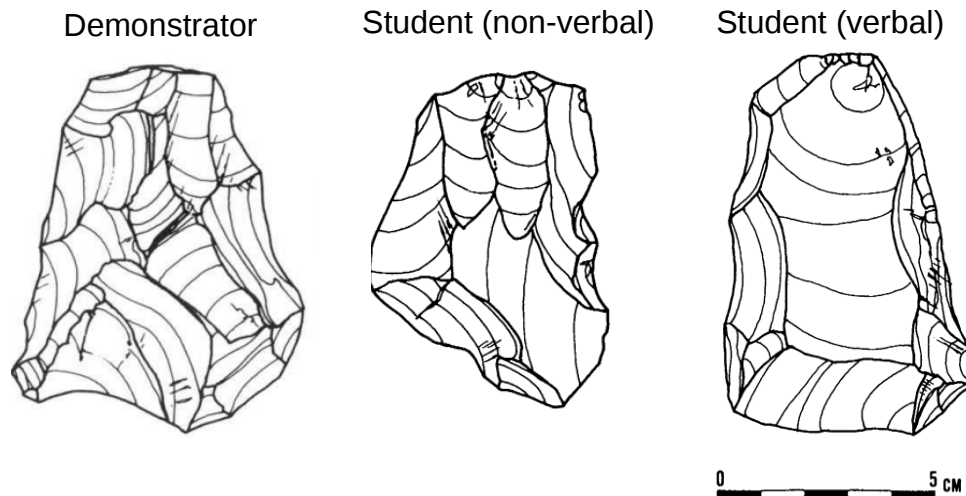
- Hierarchy
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## Learning and transmission of Levallois technology

“The rates and mean times of acquisition of the Levallois technique and of successful flake production were compared. They did not differ significantly between the two groups. From these results, we infer that **spoken language was not indispensable** for Levallois flake production in the Middle Palaeolithic.”



Ohnuma al. (1997). Transmission of tool-making through verbal and non-verbal communication: preliminary experiments in Levallois flake production.



## Stone Tools & Language

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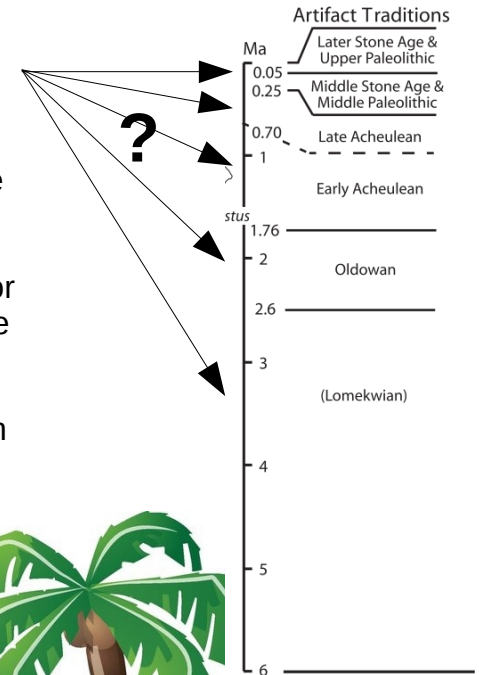
### Experiments

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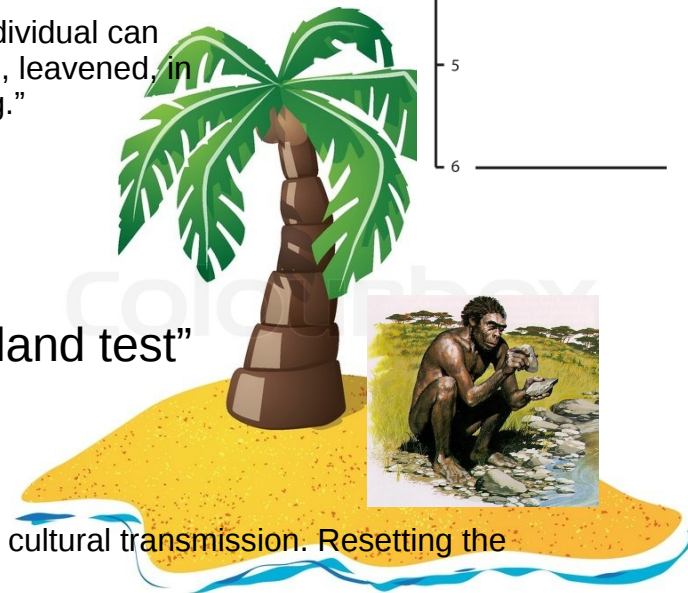
## Cultural transmission of stone tools

“[...] the frequent assumption that even the earliest stone tools serve as evidence of **high-fidelity cultural transmission** hinders investigation more than it helps. We pragmatically suggest resetting the null hypothesis for the processes underlying early stone tool production. The null hypothesis that we prefer is that early stone tools might have been so-called **latent solutions** rather than cultural material that derived from — and depended upon — modern human-like high-fidelity cultural transmission.”

“**Latent solutions** are behaviors that an individual can generate largely through individual learning, leavened, in some cases, with low-fidelity social learning.”



### The “island test”



Tennie et al. (2017). Early stone tools and cultural transmission. Resetting the null hypothesis.



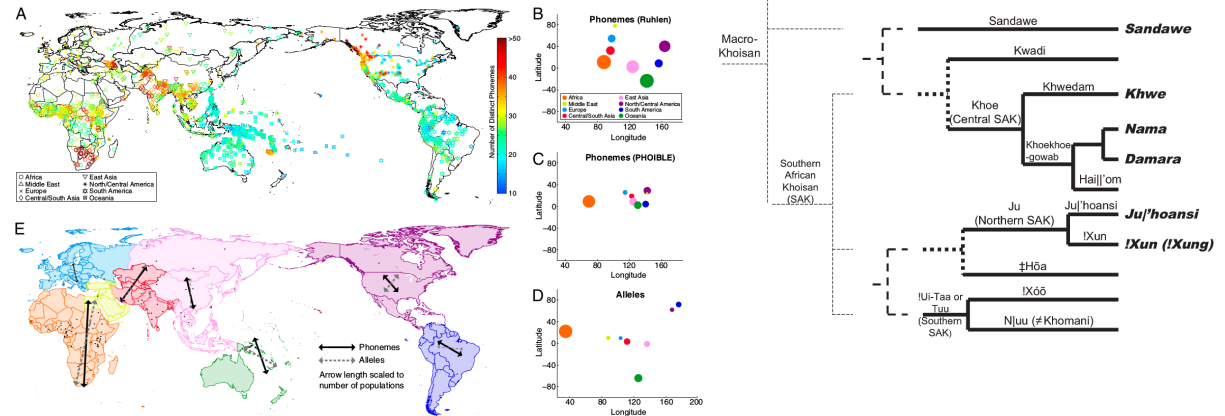
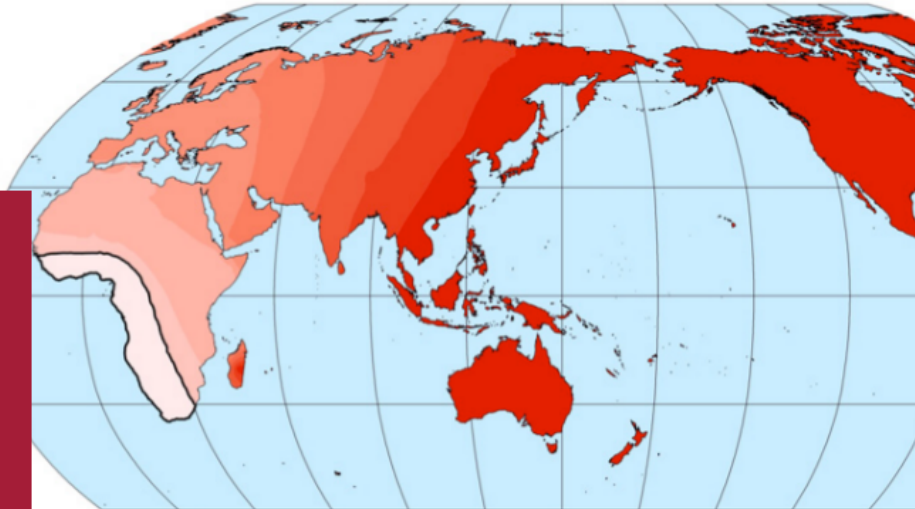
# Genetic and Linguistic Diversity

- **Linguistic Out-of-Africa Effect?**
- Diversity within Africa: The Khoisan
- Living fossils in language



# Genetic & Linguistic Diversity

- Out-of-Africa: A Linguistic Effect?
- Diversity within Africa: The Khoisan
- Living fossils in language





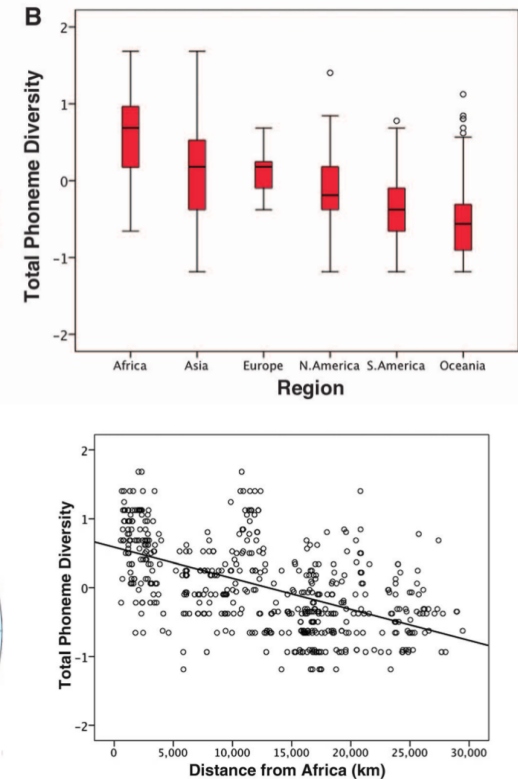
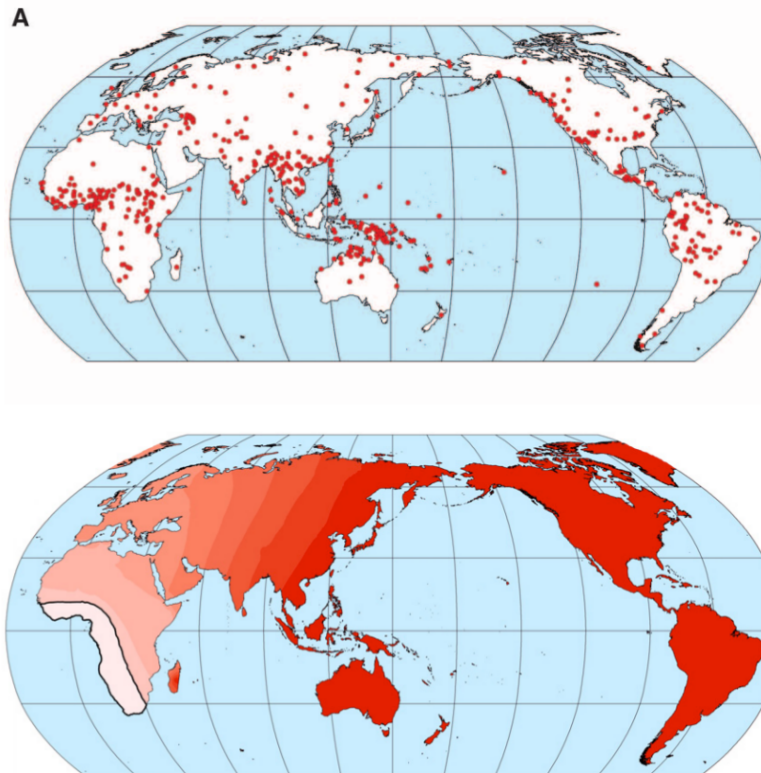


# Genetic & Linguistic Diversity

## - Out-of-Africa: A Linguistic Effect?

- Diversity within Africa: The Khoisan
- Living fossils of language

A linguistic serial founder effect?



Atkinson (2011). Phonemic Diversity Supports a Serial Founder Effect Model of Language Expansion from Africa.





# Genetic & Linguistic Diversity

A linguistic serial founder effect?

In the volume:

*Wichmann et al.*

| Variable             | cor. | significant |
|----------------------|------|-------------|
| population size      | +    | yes         |
| word length          | -    | yes         |
| distance from Africa | -    | yes         |

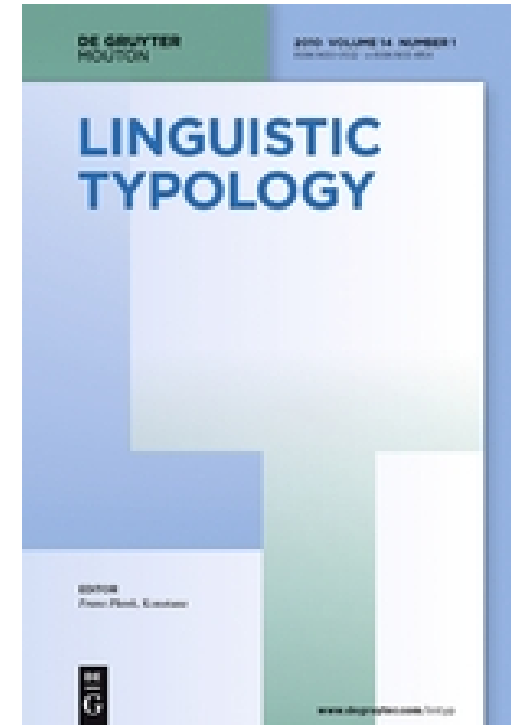
*Jäger et al.*

| Variable             | cor. | significant |
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- Out-of-Africa:  
A Linguistic Effect?

- Diversity within  
Africa: The Khoisan

- Living fossils  
in language



Plank et al. (eds.) (2011). The vanishing phonemes debate, apropos Atkinson 2011.



# Genetic & Linguistic Diversity

## - Out-of-Africa: A Linguistic Effect?

- Diversity within Africa: The Khoisan
- Living fossils of language

## A linguistic serial founder effect?

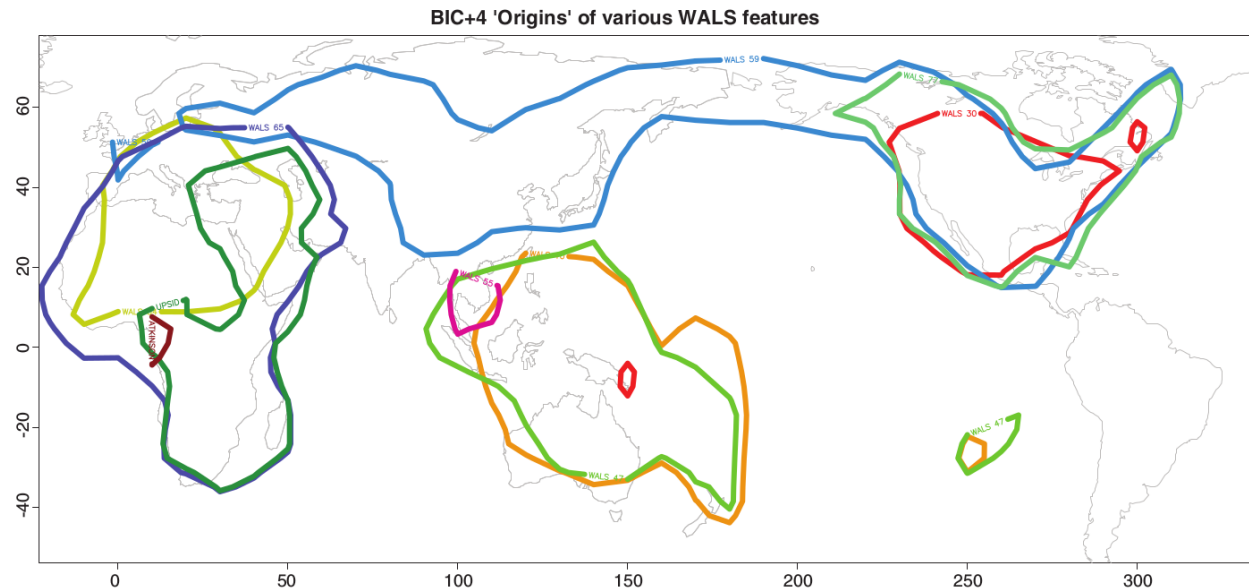


Fig. 1. Areas of “origin” of various other inventory-like linguistic characteristics as identified using Atkinson’s methodology. Notably, the origins are dispersed over the whole globe and not concentrated in Africa. The **dark red area** in Africa is the origin of phoneme inventories as proposed by Atkinson. The **dark green area** in Africa and the Near East is the corresponding area based on the UPSID phoneme inventory data. The **small red area** on the eastern tip of New Guinea is the origin for the UPSID phoneme inventory data using a quadratic geographical distance model.

Cysouw, Dediu & Moran (2012). Comment on “Phonemic Diversity Supports a Serial Founder Effect Model of Language Expansion from Africa”.

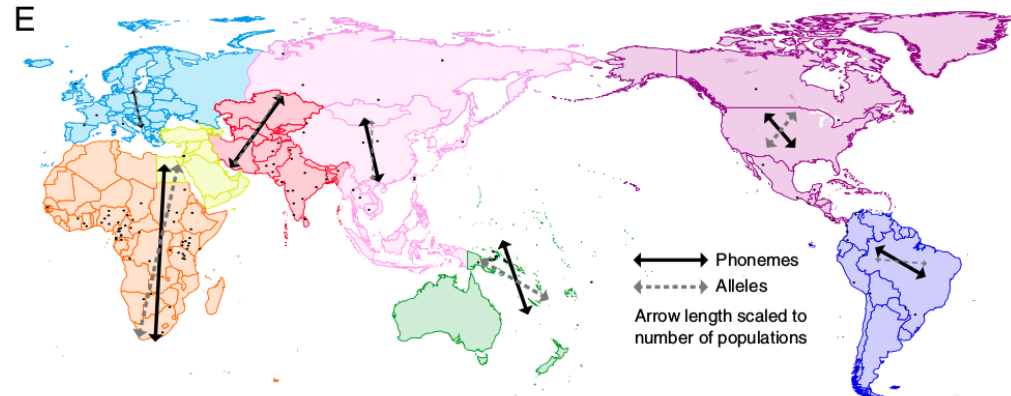
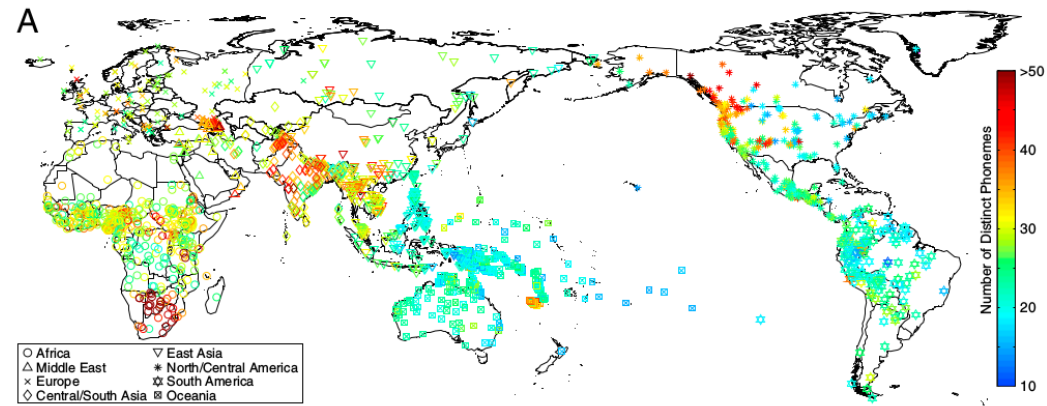
# Genetic & Linguistic Diversity

- Out-of-Africa:  
A Linguistic Effect?

- Diversity within  
Africa: The Khoisan

- Living fossils  
in language

A linguistic serial founder effect?



The rotated axis of *geographic distance* that was most strongly associated (greatest Mantel  $r$ ) with **phonemic distance** (black arrows) and **genetic distance** (gray dashed arrows) is shown.

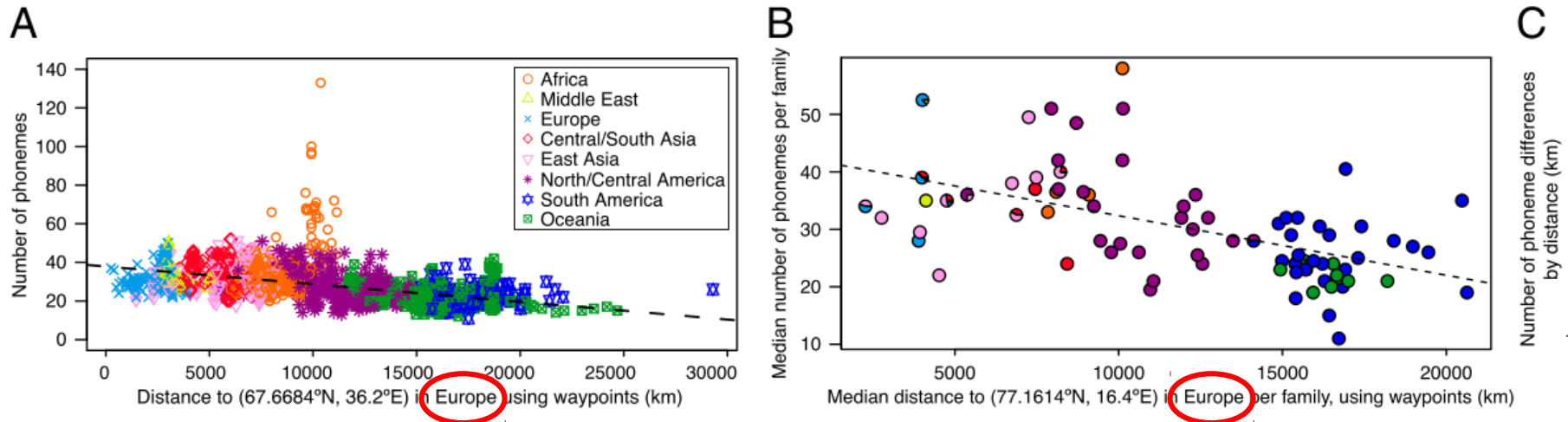
Creanza et al. (2015).

# Genetic & Linguistic Diversity

- Out-of-Africa:  
A Linguistic Effect?

A linguistic serial founder effect?

“The regional geographic axes of greatest phonemic differentiation correspond to axes of genetic differentiation, suggesting that there is a relationship between human dispersal and linguistic variation. However, the geographic distribution of phoneme inventory sizes **does not follow the predictions of a serial founder effect** during human expansion out of Africa.”



Creanza et al. (2015).



# Genetic and Linguistic Diversity

- Linguistic Out-of-Africa Effect?
- **Diversity within Africa: The Khoisan**
- Living fossils in language



# Genetic & Linguistic Diversity

- Out-of-Africa:  
A Linguistic Effect?

- Diversity within  
Africa: The Khoisan

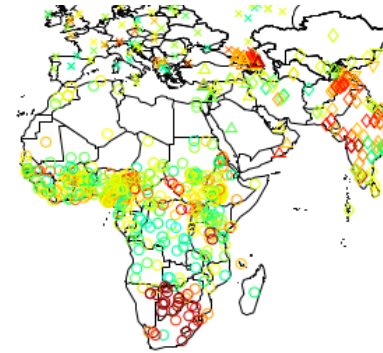
- Living fossils  
in language



**Silent stalkers.** !Kung hunters may use clicks while sneaking up on prey in the savanna.



**All alone.** Researchers ponder why the Hadzabe live so far from other click speakers.



|                      |                         |
|----------------------|-------------------------|
| ○ Africa             | ▽ East Asia             |
| △ Middle East        | * North/Central America |
| × Europe             | ☆ South America         |
| ◇ Central/South Asia | ⊠ Oceania               |

Pennisi (2004). The first language?

## IV. KHOISAN

Schapera is the author of the convenient term Khoisan, compounded of the Hottentot's name for themselves (Khoi) and their name for the Bushmen (San). Culturally, two groups are usually distinguished, the cattle-raising Hottentots with a somewhat complex political organization and sense of ethnic distinctness and the hunting, food-gathering Bushmen. Both of these peoples speak languages whose most conspicuous feature is the presence of click-sounds.<sup>1</sup>

Greenberg (1963). Languages of Africa.





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Nielsen et al. (2017).

Lat

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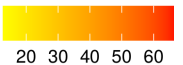


**Ancient  
migration?**



Family ○ Bantu × Clicks □ Hadza ◇ Sandawe △ Southern Khoisan

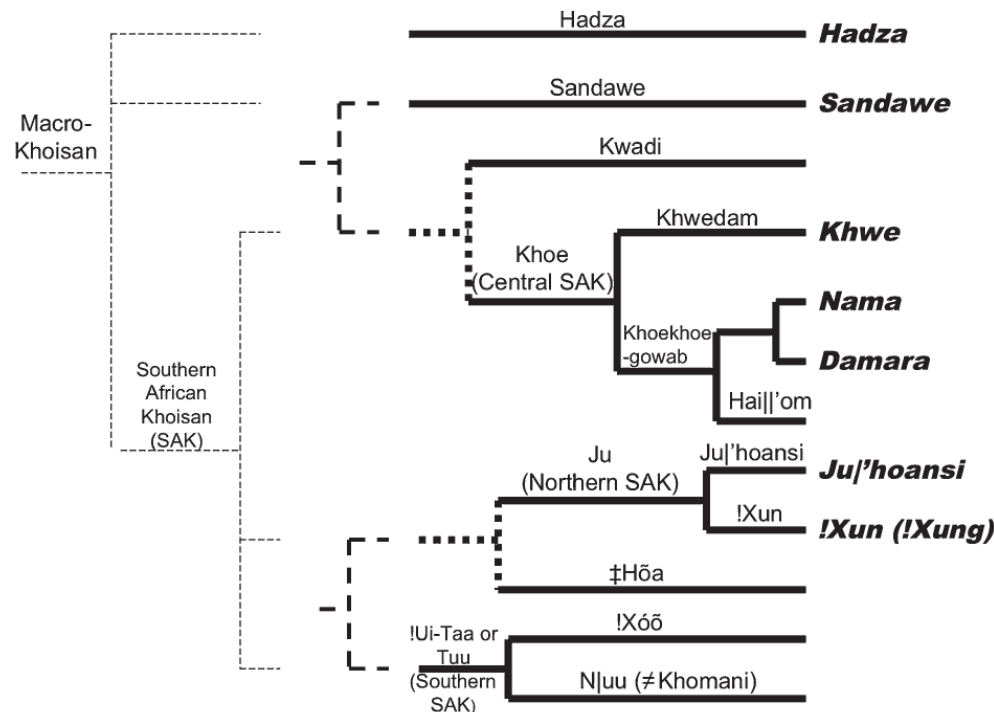
Consonants



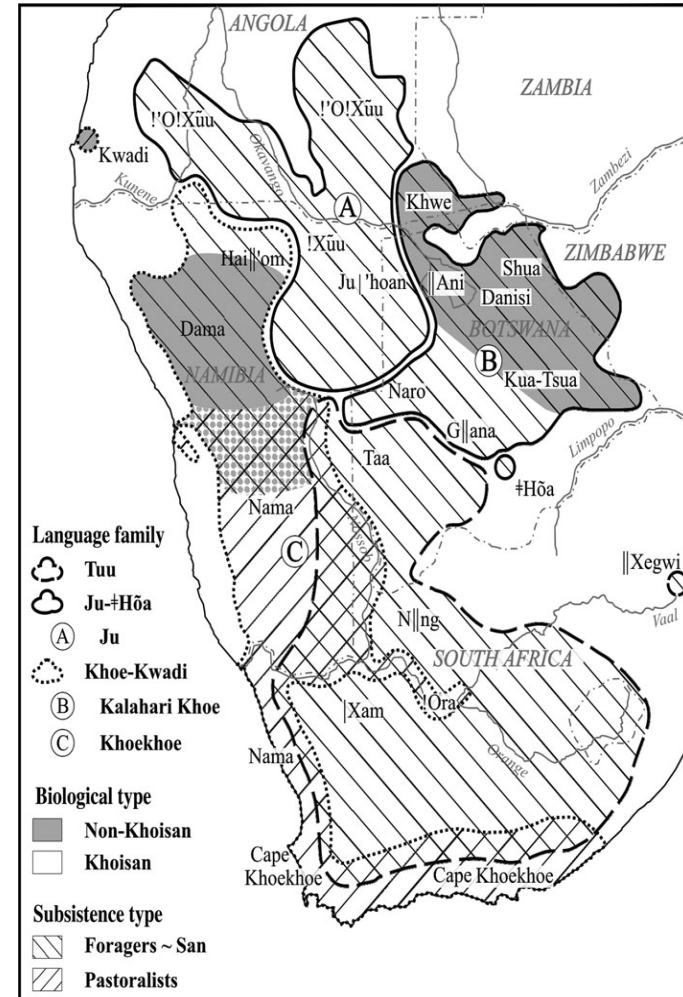


# Genetic & Linguistic Diversity

Note: the highest level classification of “Khoisan” is generally **not accepted** by experts



Tishkoff (2007). History of Click-Speaking Populations of Africa Inferred from mtDNA and Y Chromosome Genetic Variation.



Güldemann & Stoneking (2008). A historical appraisal of clicks: a linguistic and genetic population perspective.



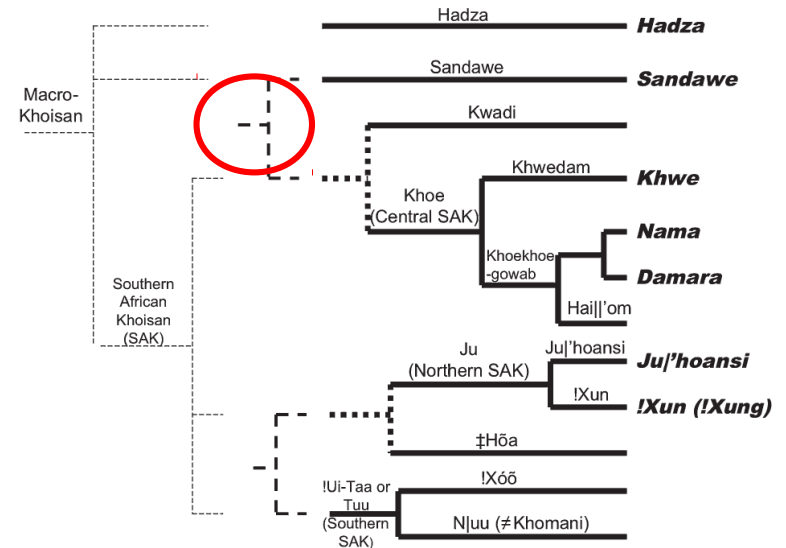
# Genetic & Linguistic Diversity

Is there a **deep connection** between the Sandawe and Khoe-Kwadi?

## Genetic evidence

“New genetic data show that the Sandawe and southern African click speakers share rare mtDNA and Y chromosome haplogroups; however, common ancestry of the 2 populations dates back > 35,000 years.”

Tishkoff (2007).



## Linguistic evidence

| Pronoun element                      | Proto-Khoe-Kwadi   | Sandawe          |
|--------------------------------------|--|------------------|
| 1st person singular pronoun          | *ti (Kwadi <i>tʃi</i> )  | <i>tsi</i>       |
| 2nd person singular pronoun          | *sa  | <i>ha-</i>       |
| 3rd person pronoun base              | *xa- (Kwadi <i>ha-</i> )   | <i>he-</i>       |
| 3rd person masculine singular suffix | *-V <sup>[front]</sup> (Khoe *-bV <sup>[front]</sup> , *-mV <sup>[front]</sup> ) | <i>-w(e), -m</i> |
| 3rd person feminine singular suffix  | *-V <sup>[front]</sup> (Khoe *-sV <sup>[front]</sup> )                           | <i>-su</i>       |

Güldemann (in prep.)



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## The traditional comparative method

Indo-European Cognates for the Root “Hundred”

| <i>Branch</i> | <i>Language</i> | <i>Term</i> | <i>Meaning</i>    |
|---------------|-----------------|-------------|-------------------|
| Celtic        | Welsh           | cant        | hundred           |
|               | Old Irish       | cēt         | hundred           |
| Italic        | Latin           | centum      | hundred           |
| Tocharian     | TochA           | känt        | hundred           |
|               | TochB           | kante       | hundred           |
| Greek         | Greek           | ἑκατόν      | hundred           |
| Germanic      | Old English     | hund        | hundred           |
|               | OldHighGerm.    | hunt        | hundred           |
|               | Gothic          | hunda       | 100, 120          |
|               | OldSaxon        | hunderod    | (long) hundred    |
| Baltic        | Lithuanian      | šimtas      | hundred           |
|               | Latvian         | simts       | hundred           |
| Slavic        | OldChurchSlav.  | sŭto        | hundred           |
|               | Bulgarian       | sto         | hundred           |
| Anatolian     | Lycian          | sñta        | unit of 10 or 100 |
| Indo-Iranian  | Avestan         | satəm       | hundred           |
|               | OldIndic        | śatām       | hundred           |

Linguists have been able to reconstruct a Proto-Indo-European sequence of phonemes, \*k'mtom, that could have developed into all the attested phonemes in all the attested daughter forms.

Anthony (2007). The Horse, the wheel, and language. p.30





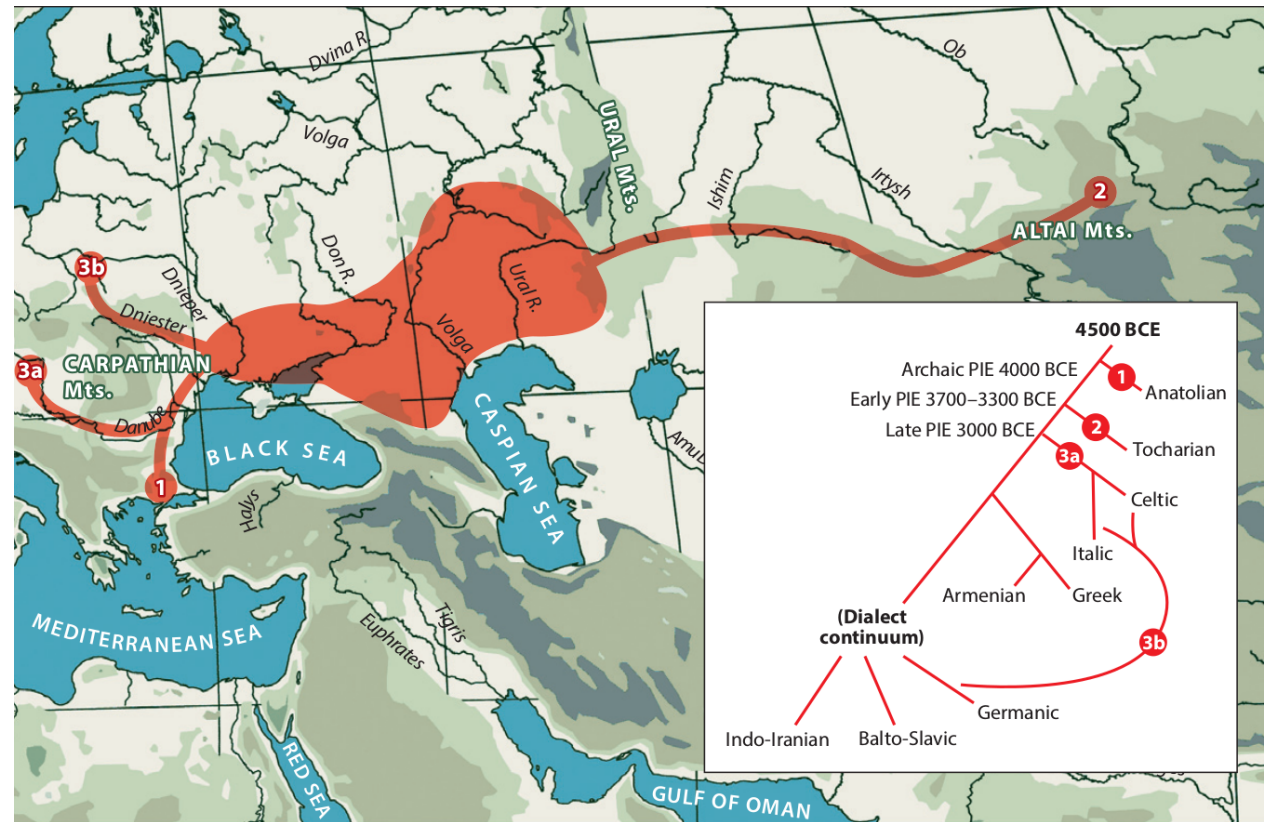
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## The traditional comparative method



Anthony & Ringe (2015). The Indo-European homeland from linguistic and archaeological perspectives. p.209





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## Is there hope beyond the comparative horizon?

“There are approximately **300 separate stocks** on earth, which further comparative work may reduce to as few as **200 quasi-stocks**, some of which will surely prove to be true stocks. The tests described above offer the prospect of being able to extend the fade-out point regularly to the time depth represented by the age of Afroasiatic or Indo-Uralic [...] Given present knowledge of language change and probability, however, descent and reconstruction will **never be traceable beyond approximately 10,000 years.**”

Nichols (1997). Modeling ancient population structures and movement in linguistics. p. 365





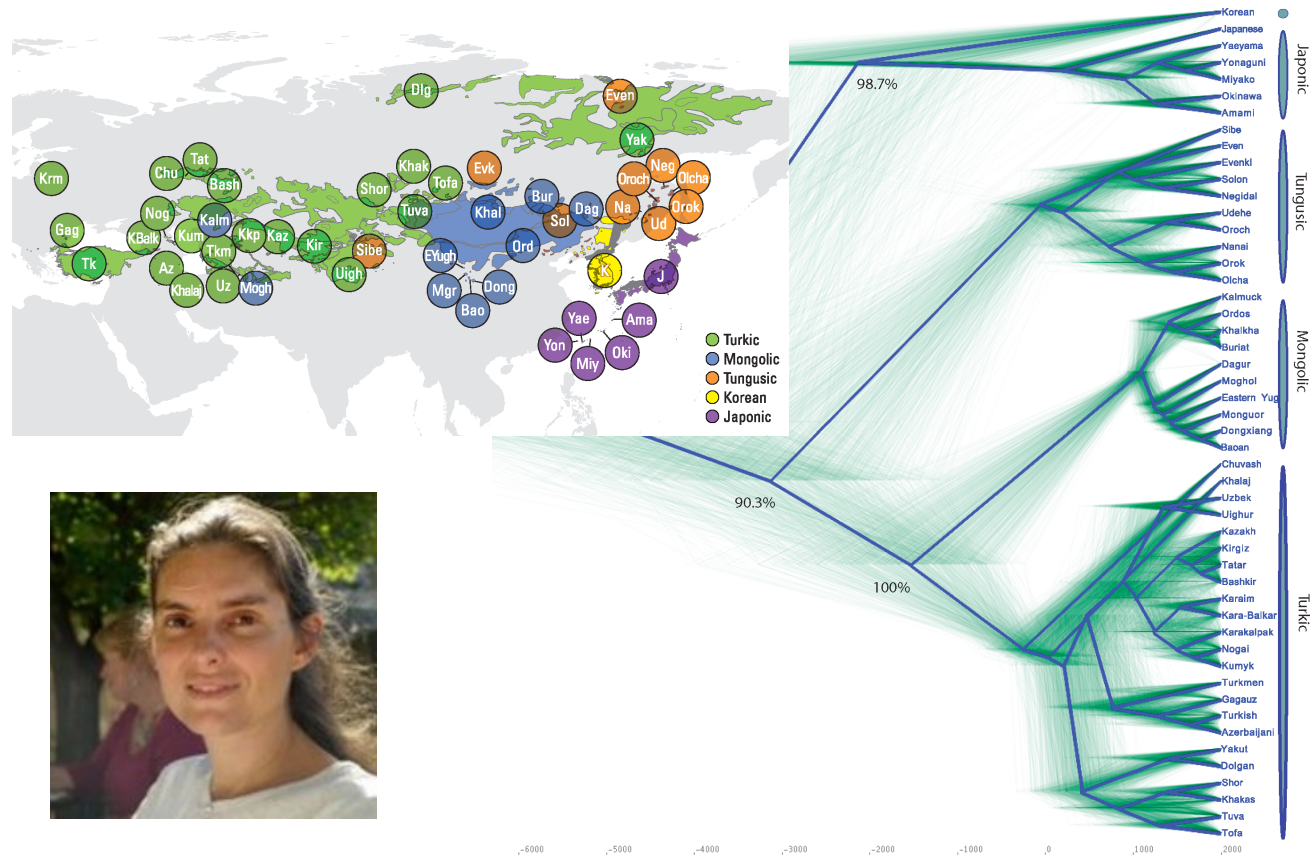
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## Macrofamilies and their support: Transeurasian



Robbeets & Bouckaert (2018). Bayesian phylolinguistics reveals the internal structure of the Transeurasian family.



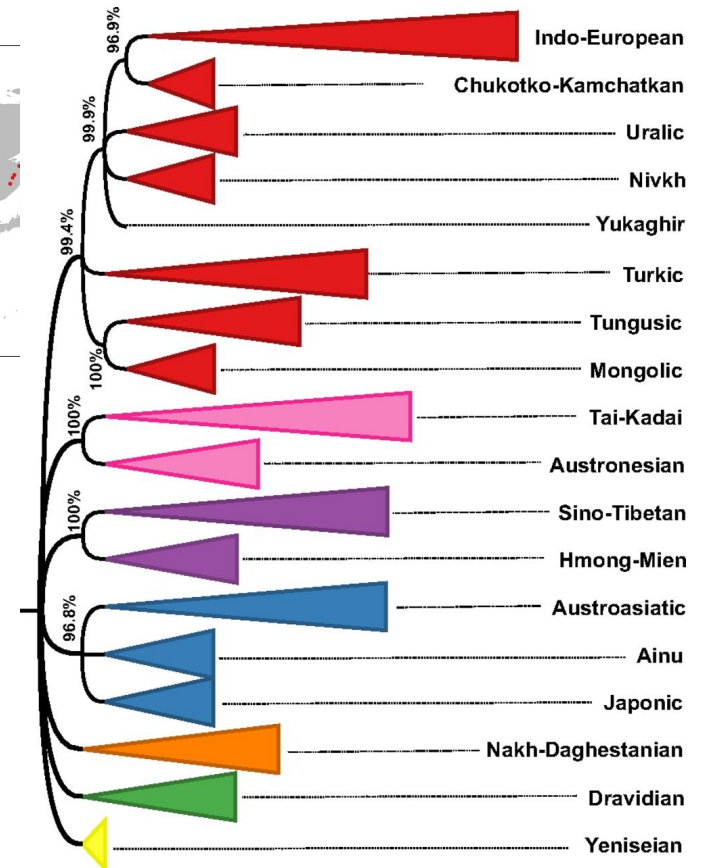
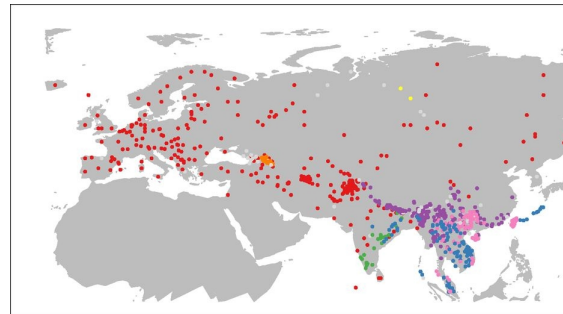
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## Macrofamilies and their support



Jaeger (2015). Support for linguistic macrofamilies from weighted sequence alignment.



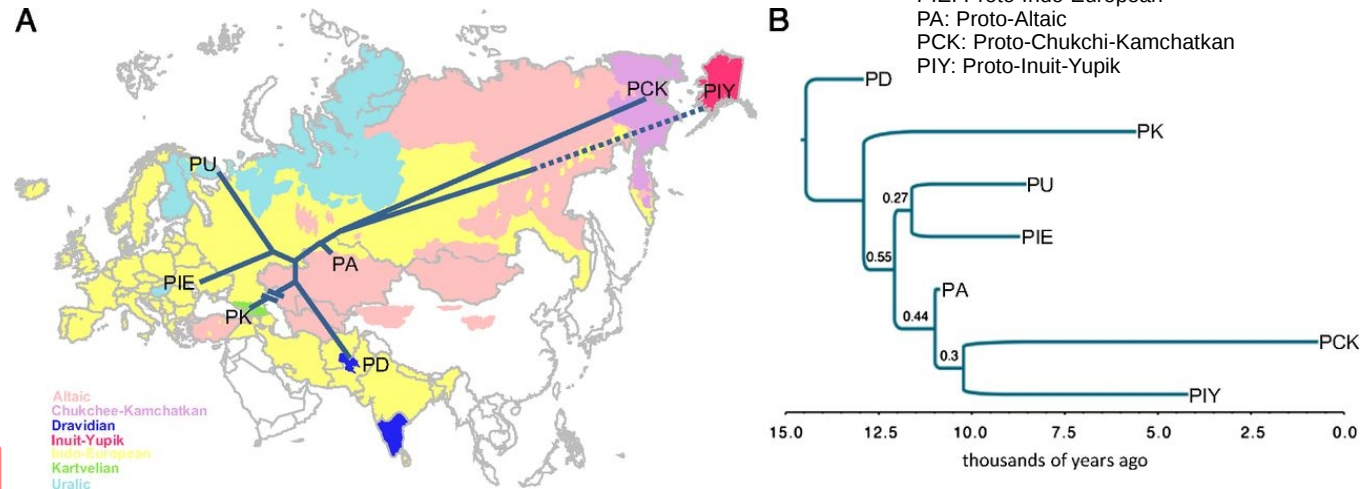
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## Macrofamilies and their support



“We derive a dated phylogenetic tree of this proposed superfamily with a time-depth of ~14,450 y, implying that some frequently used words have been retained in related forms since the end of the last ice age.”

Pagel, Atkinson, Calude, and Meade (2013). Ultraconserved words point to deep language ancestry across Eurasia.





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## Ultraconserved words?



Pagel, Atkinson, Calude, and Meade (2013). Ultraconserved words point to deep language ancestry across Eurasia.

Table 1. Twenty-three words with cognate class sizes of four or more among the Eurasiatic language families

| Meaning  | Cognate class size* | I-E rate <sup>†</sup> | Half-life 1,000s of years | Frequency of use <sup>‡</sup> | Part of speech |
|----------|---------------------|-----------------------|---------------------------|-------------------------------|----------------|
| Thou     | 7                   | 0.064                 | 10.83                     | 2,524                         | Pronoun        |
| I        | 6                   | 0.009                 | 77                        | 4,332                         | Pronoun        |
| Not      | 5                   | 0.082                 | 8.45                      | 7,602                         | Adverb         |
| That     | 5                   | 0.188                 | 3.69                      | 5,846                         | Adjective      |
| We       | 5                   | 0.037                 | 18.73                     | 2,956                         | Pronoun        |
| To give  | 5                   | 0.076                 | 9.12                      | 1,606                         | Verb           |
| Who      | 5                   | 0.009                 | 77                        | 1,172                         | Pronoun        |
| This     | 4                   | 0.218                 | 3.18                      | 11,185                        | Adjective      |
| What     | 4                   | 0.069                 | 10.04                     | 3,058                         | Adverb         |
| Man/male | 4                   | 0.338                 | 2.05                      | 2,800                         | Noun           |
| Ye       | 4                   | 0.132                 | 5.25                      | 1,459                         | Pronoun        |
| Old      | 4                   | 0.253                 | 2.74                      | 746                           | Adjective      |
| Mother   | 4                   | 0.236                 | 2.94                      | 717                           | Noun           |
| To hear  | 4                   | 0.235                 | 2.95                      | 680                           | Verb           |
| Hand     | 4                   | 0.082                 | 8.45                      | 658                           | Noun           |
| Fire     | 4                   | 0.175                 | 3.96                      | 398                           | Noun           |
| To pull  | 4                   | 0.453                 | 1.71                      | 279                           | Verb           |
| Black    | 4                   | 0.191                 | 3.62                      | 135                           | Adjective      |
| To flow  | 4                   | 0.34                  | 2.04                      | 91                            | Verb           |
| Bark     | 4                   | 0.379                 | 1.82                      | 49                            | Noun           |
| Ashes    | 4                   | 0.265                 | 2.62                      | 23                            | Noun           |
| To spit  | 4                   | 0.204                 | 3.38                      | 23                            | Verb           |
| Worm     | 4                   | 0.216                 | 3.19                      | 21                            | Noun           |

\*Defined as the number (of seven) of Eurasiatic language families that are reconstructed as cognate for the word used to convey the meaning shown.

<sup>†</sup>The rate of lexical replacement measured in number of expected new or unrelated words per 1,000 y and rates of replacement expressed as "half-lives" or the expected time until a word has a 50% chance of being replaced by a new noncognate word (14).



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## Global etymologies?

10 KU(N) 'who?'

KHOISAN: ≠Au.//eĩ kama 'when, if,' xa (interrogative particle), !Kung ka 'when,' !kũ(-de) 'who'; G//abake /kam 'when,' Naron kama 'when, if,' Nama hamo 'when,'; /Xam !ku(dεxa) 'who,' xa (interrogative particle). [SAK 384, 388, 757, 764, UOL 70]

NIGER-CONGO: Pam kǎgǎ 'which,' Dama kǎŋ 'which,' Jukun ákē 'what,' Proto-Bantu \*kí~ kǎ 'which,' Swahili ga-ni 'what, why, what kind.' [BA]

NILO-SAHARAN: Fur kii 'who,' ka 'what,' Daza ka 'which,' Masai ka 'which,' Didinga ŋani 'who' (< \*kani ?), Liguri keneen 'who,' Nyala k-rem 'how many,' Shatt k-reñ 'how many,' Shabo kukne 'who.' [NS 149, CN 126, HF 12]

AFRO-ASIATIC: Proto-Afro-Asiatic \*k(w) ~ \*q(w) 'who'; Semitic: Proto-Semitic \*kV 'how,' Arabic ka, Geez kama, Aramaic kə, Akkadian kima ~ ki 'how,' South Arabian ko 'how, why,' Mehri ūkō 'why'; ?Berber: Tuareg akken 'how,' Gdames (mə-)k; Cushitic: Proto-Cushitic \*kw 'who,' Somali kú-ma 'who (masc.),' Oromo ka-mi 'who,' aka 'how'; Omotic: Kaffa kō-nē 'who,' Mao konne, Kullo hone, Wolamo ōne, Beja kāk(u) 'how'; Chadic: Proto-Chadic \*k'(w) 'who,' Hausa k'ā, Bura ga 'what,' Logone γwani, Somrai kāna 'who,' Mubi gin. [N 232, UOL 70]

INDO-EUROPEAN: Proto-Indo-European \*k<sup>wo</sup> ~ \*k<sup>wi</sup> 'who,' \*-k<sup>we</sup> (coordinating conjunction); Indic: Sanskrit kas 'who'; Iranian: Avestan kō; Armenian o (< \*k<sup>wo</sup>); Anatolian: Hittite kuis 'who,' kuit 'what,' Luwian kui 'who,' Lydian qis 'who,' qid 'what'; Albanian kë 'whose'; Italic: Latin quis 'who,' quis-que 'whoever,' quod 'what,' quam 'how, as,' quom 'when,' (arma virum)-que '(arms) and (the man)'; Celtic: Old Irish cia 'who,' cid 'what'; Germanic: Gothic hwas 'who,' English who, what, when, where,

Bengston & Ruhlen (1996). Global etymologies.



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## Other ultraconservative linguistic structures?

| Rank | ID  | Name                                | Abbr. name | PC <sub>1</sub> | PC <sub>1</sub> * | PC <sub>2</sub> | PC <sub>3</sub> | PC <sub>4</sub> |
|------|-----|-------------------------------------|------------|-----------------|-------------------|-----------------|-----------------|-----------------|
| 1    | 18  | Absence of Common Consonants        | AbsComC    | 4.41            | 5.16              | -1.01           | 0.31            | 0.32            |
| 2    | 11  | Front Rounded Vowels                | FrRoundV   | 3.48            | NA                | -3.34           | 1.16            | 1.09            |
| 3    | 136 | M-T Pronouns                        | MTPron     | 3.28            | NA                | 0.35            | -3.51           | 1.15            |
| 4    | 86  | Order of Genitive and Noun          | GenN       | 3.28            | 4.17              | 2.30            | 0.46            | 0.57            |
| 5    | 83  | Order of Object and Verb            | OV         | 3.21            | 3.75              | 2.97            | 1.97            | 1.33            |
| 6    | 85  | Order of Adposition and Noun Phrase | AdposNP    | 2.94            | 3.63              | 2.77            | 1.69            | 0.84            |
| 7    | 73  | The Optative                        | Optative   | 2.81            | 2.70              | -1.41           | 0.63            | -1.09           |
| 8    | 80  | Verbal Number and Suppletion        | VnumSupp   | 2.61            | NA                | 0.58            | -5.61           | 1.94            |
| 9    | 82  | Order of Subject and Verb           | SV         | 2.35            | 2.59              | -0.10           | 0.66            | 0.83            |
| 10   | 119 | Nominal and Locational Predication  | NomLocPred | 2.25            | 3.21              | 0.98            | -0.51           | -1.49           |

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Dediu & Cysouw (2013). Some structural aspects of languages are more stable than others.



# Genetic & Linguistic Diversity

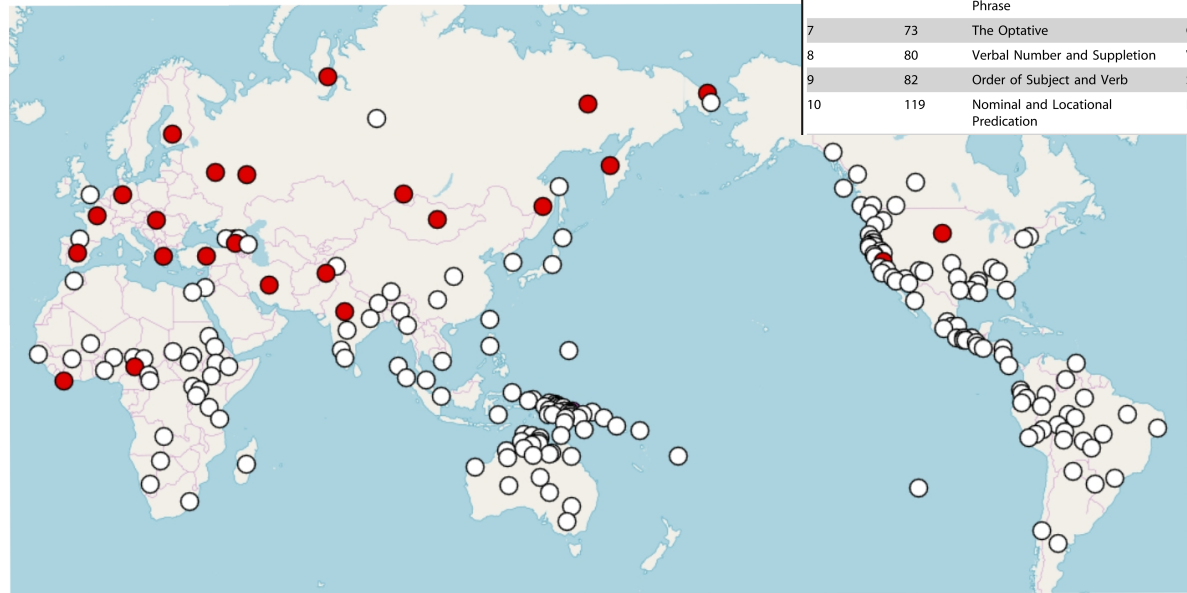
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## Other ultraconservative linguistic structures?

Red: M-T pronouns, paradigmatic  
White: No M-T pronouns



| Rank | ID  | Name                                | Abbr. name |
|------|-----|-------------------------------------|------------|
| 1    | 18  | Absence of Common Consonants        | AbsComC    |
| 2    | 11  | Front Rounded Vowels                | FrRoundV   |
| 3    | 136 | M-T Pronouns                        | MTPrn      |
| 4    | 86  | Order of Genitive and Noun          | GenN       |
| 5    | 83  | Order of Object and Verb            | OV         |
| 6    | 85  | Order of Adposition and Noun Phrase | AdposNP    |
| 7    | 73  | The Optative                        | Optative   |
| 8    | 80  | Verbal Number and Suppletion        | VnumSupp   |
| 9    | 82  | Order of Subject and Verb           | SV         |
| 10   | 119 | Nominal and Locational Predication  | NomLocPred |

Johanna Nichols, David A. Peterson. (2013). M-T Pronouns.  
Nichols & Peterson (1996). The Amerind personal pronouns.  
Dediu & Cysouw (2013). Some structural aspects of languages are more stable than others.



Contact:



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“Words, Bones, Genes, Tools”

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