

Origins and Evolution of Language
Week 10: Sign language as a window into
language origins

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Assignment 2

- Due on 14th December
- Another 1500 word essay **on a different topic from essay 1**
- MSc students only: you can set your own question, must be agreed in writing by Kenny by noon on 6th December
- Re-read the assignment brief and advice, FAQ
- No questions after noon on 11th December (extended for people with extensions, but beware Christmas break!)

General advice based on Assignment 1: important

- Make sure to answer the question set, not a nearby one!
- Don't try to go too broad - we have only given you 1500 words.
- Use sources (citations) to support claims.
- Don't just summarise stuff others have said – critique it! Is it convincing? If not, why not? If there are competing claims, don't just throw your hands up - are there grounds for finding one more plausible than the other?
- Make your argument explicit - don't force us to guess what your conclusion is from a piece of evidence you present.
- It's better to write simply and concisely - no need for poetic language, no need for a paragraph of platitudes at the start and end.
- Use the Skills Centre for help, or get a friend to read it and see if they can understand your argument.

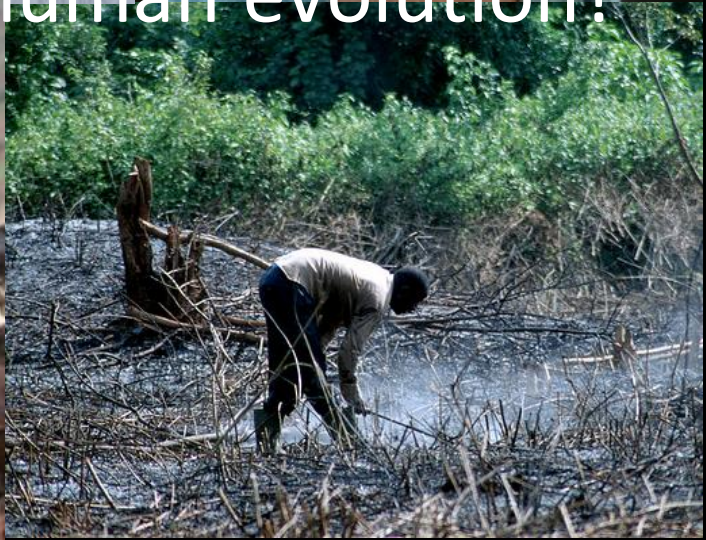
General advice based on Assignment 1: more minor

- In your first paragraph, say what your argument is going to be and what the conclusion is.
- Use quotes sparingly, if at all – summarizing in your own words shows us you understand, and often you can make the important point more concisely.
- Learn the technical skill of citing correctly! See assignment brief for advice, or just look at how the papers you are reading do it, or ask the Skills Centre.
- Remember that language is not synonymous with writing (a recent invention!) or speech (sign languages are languages).

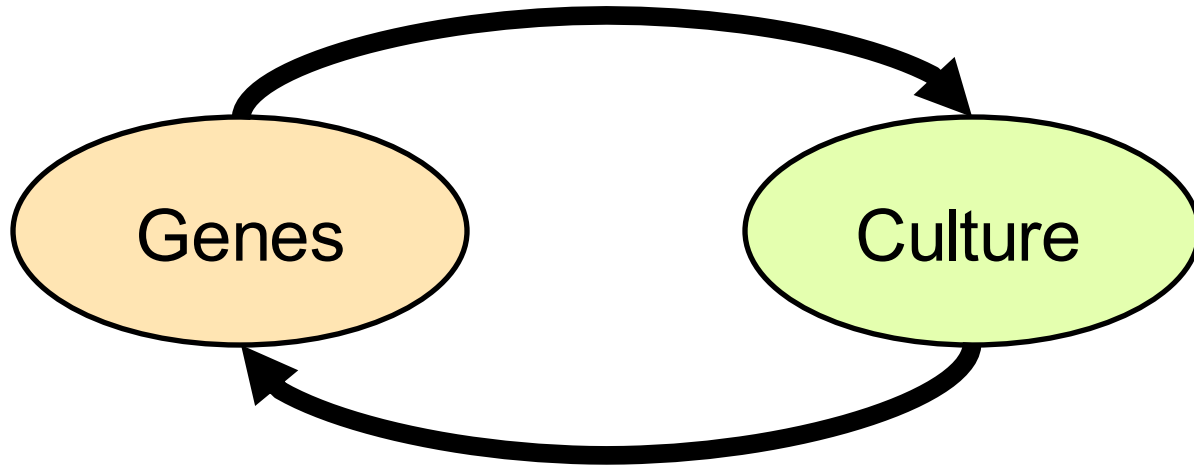
Three slides on gene-culture co-evolution
(the lost lecture)

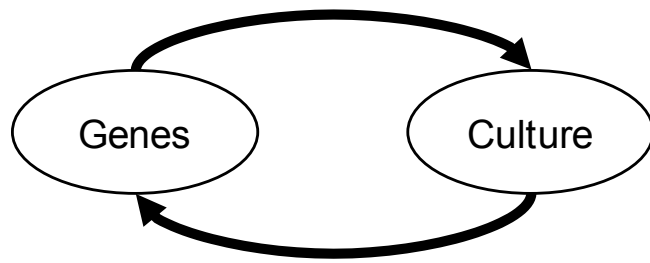


Has culture ended human evolution?



Gene-culture co-evolution





How could this work for language?

- Biological adaptations (rudimentary vocal learning, sequence and compositionality learning, mindreading) set scene for cultural transmission
- Cultural evolution begins to create structured (proto-)linguistic system
- Presence of structured, functional language creates/increases selection pressures for language-relevant skills, natural selection ensues
 - Enhanced vocal learning, better sequence/grammar learning, better mindreading
- Enhanced linguistic capacities allow cultural transmission to do more
 - Language evolves culturally to gain new functions, more complex structures, ...
- And repeat

For review: Smith, K. (2020). How Culture and Biology Interact to Shape Language and the Language Faculty. *Topics in Cognitive Science*, 12, 690–712.

Sign language as a window into language origins

Sign languages are languages!

- They have phonology, arbitrary and conventionalized lexicons, morphology, syntax, rich sociolinguistics, ...
- They can be used for all the things spoken languages can be used for
- They are manual rather than spoken, so they sometimes solve similar problems in different ways
- They are relatively young, so relatively little grammaticalization has taken place

cat



flower



orange



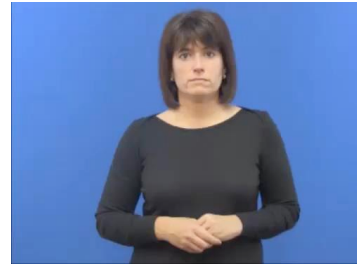
black



insurance



cheap



High frequency

no



in



her



Lower frequency

adventure



information



conversation



High frequency

no



in



her



Lower frequency

adventure



information



conversation



Phonology: handshape, orientation, location, movement, non-manual features (e.g. facial expression)

talk



work



afternoon



name



English basic word order: Subject-Verb-Object

BSL basic word order: Object-Subject-Verb

“The man crossed the bridge”

Bridge (flat hand) man walk across

“Why was the black cat climbing the tree in your garden yesterday?”

Yesterday your garden tree black cat climb why

Four angles on manual communication in language evolution research

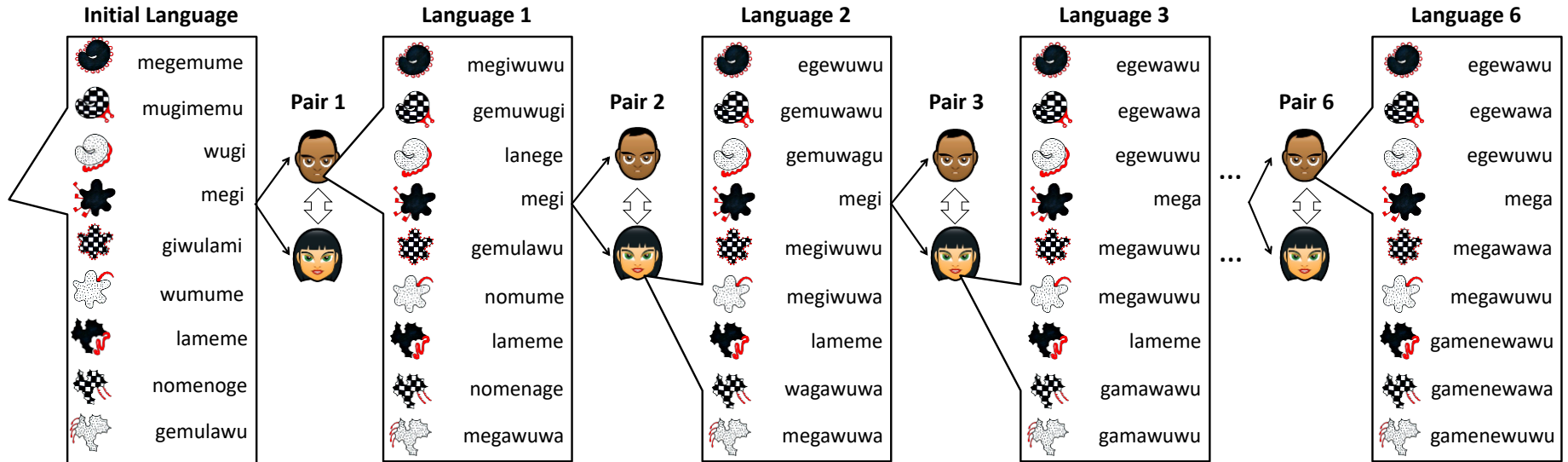
1. Naturally-occurring gestural communication in great apes
 - E.g. Hobaiter, C. (2020). Gestural Communication in the Great Apes: Tracing the Origins of Language. In L. M. Hopper & S. R. Ross (Eds.), *Chimpanzees in Context: A Comparative Perspective on Chimpanzee Behavior, Cognition, Conservation, and Welfare*, (pp. 233-259). Chicago, IL: University of Chicago Press.
2. Gestural communication in language-trained apes
 - E.g. Gardner, R.A. and Gardner, B.T. (1969). Teaching sign language to a chimpanzee. *Science*, 165, 664-672.

Four angles on manual communication in language evolution research

3. Manual communication as a novel linguistic medium for controlled experiments
 - E.g. iterated learning experiments
4. Emerging sign languages as real-world “natural experiments”
 - Featuring natural languages

Evolving artificial sign languages in the lab

Reminder from last week



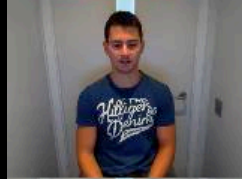
		Functional dimension			
		person	location	object	action
Thematic dimension	food	chef	restaurant	frying pan	to cook
	religion	vicar	church	bible	to preach
	photography	photographer	darkroom	camera	to take a photo
	music	singer	concert hall	microphone	to sing
	hair styling	hairdresser	hair salon	scissors	to give a haircut
	law enforcement	police officer	prison	handcuffs	to make an arrest

Motamedi, Y., Schouwstra, M., Smith, K., Culbertson, J., & Kirby, S. (2019). Evolving artificial sign languages in the lab: from improvised gesture to systematic sign. *Cognition*, 192, 103964.

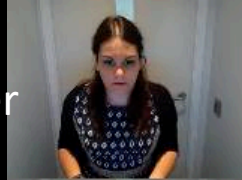
Chef



Vicar



Photographer



Singer



Hairdresser



Police officer

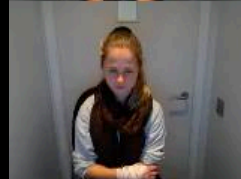


Improvisation

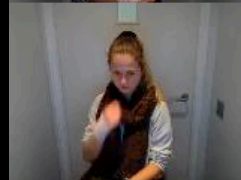
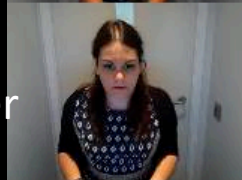
Chef



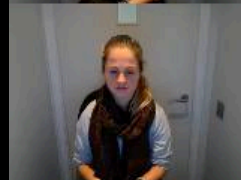
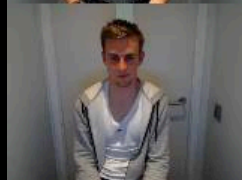
Vicar



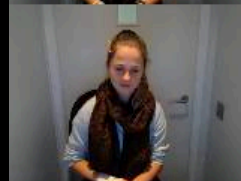
Photographer



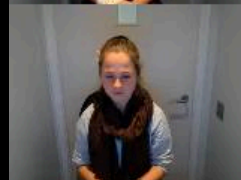
Singer



Hairdresser



Police officer



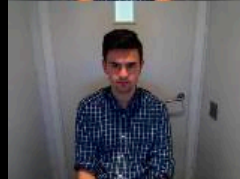
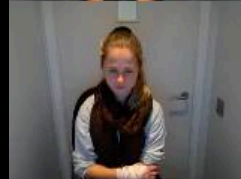
Improvisation

First generation

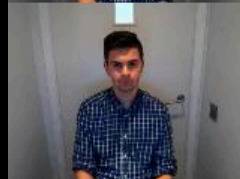
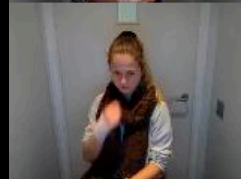
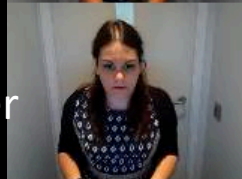
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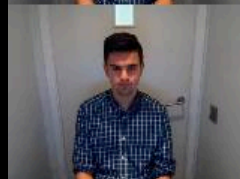
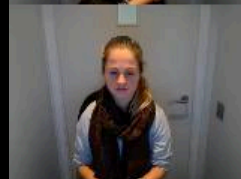
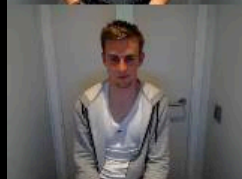
Vicar



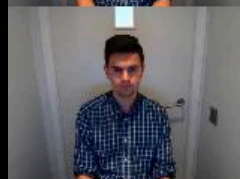
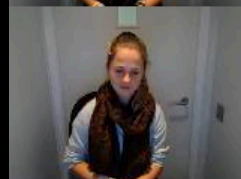
Photographer



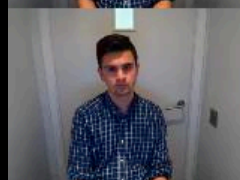
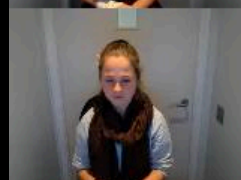
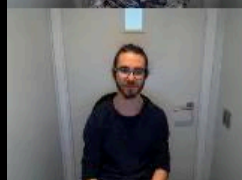
Singer



Hairdresser

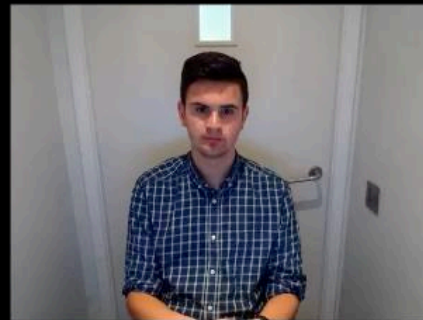
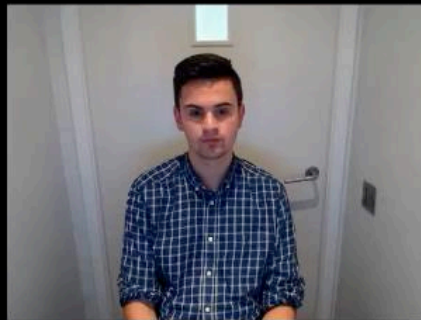
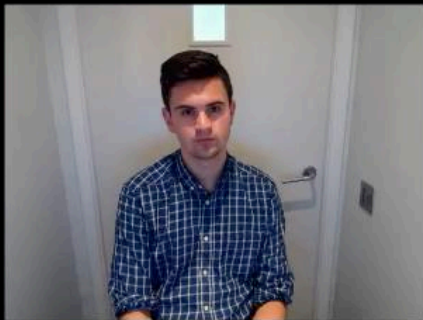


Police officer



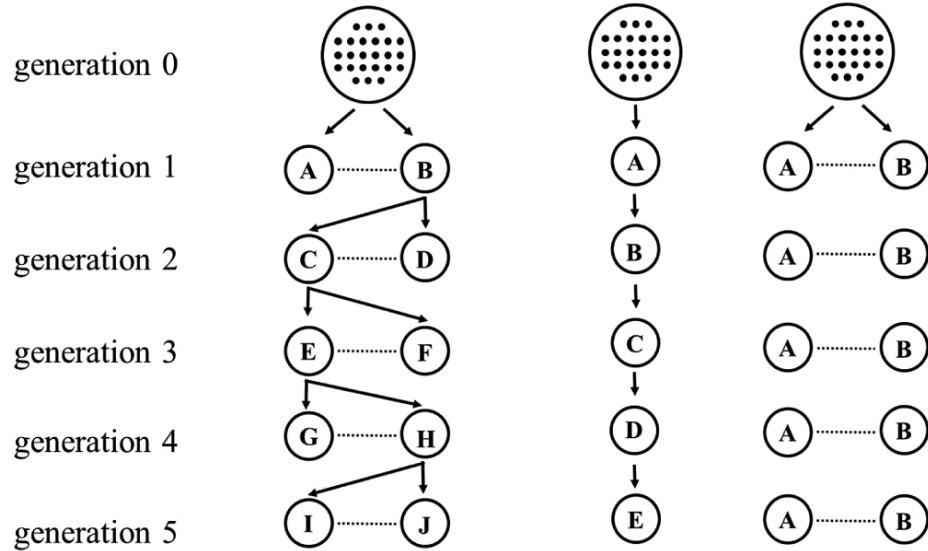
Improvisation

First generation



Experiment 1
Transmission
plus
interaction

Experiment 2
Transmission
only Interaction
only







Sign language emergence in the wild

Natural experiments

- Observational, real-world
- Individuals are exposed to different conditions that are determined by factors outside of the control of the investigator
 - Staggered introduction of carrier bag charges in UK nations
 - Minimum Unit Pricing for alcohol in Scotland vs Northern England
 - Differing Covid lockdown policies in Scotland vs England or globally

Natural experiments in sign language emergence

Whenever communities form where some or all individuals cannot access or use the ambient spoken language, new manual communication systems rapidly form

Homesign: isolated deaf children in hearing households

Village sign languages: rural communities with high proportion of deaf community members

Deaf community sign languages: in schools for deaf students; in cities where deaf communities form

Homesign

Relati

- Same meaning, same form
- Iconicity important for communicating with non-signers
- Noun-verb distinction



From Goldin-Meadow, S. (2012). Homesign: gesture to language. In R. Pfau, M. Steinbach and B. Woll (Eds.) *Sign Language: An International Handbook* (pp 601-625). Berlin: De Gruyter Mouton.

Homesign



Stable word order tendencies

- OV
- SV

Inflection-like use of space

- you give me vs I give you

Possible evidence of hierarchy?

Homesign

Markers of past and future,
negation, wh-words



From Goldin-Meadow, S. (2012). Homesign: gesture to language. In R. Pfau, M. Steinbach and B. Woll (Eds.) *Sign Language: An International Handbook* (pp 601-625). Berlin: De Gruyter Mouton.

Al-Sayyid Bedouin Sign Language

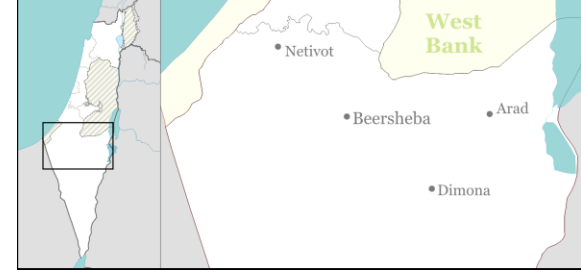
[See also: Kata Kolok (Indonesia), Adamarobe (Ghana), Central Taurus Dsign Language (Turkey), ...]

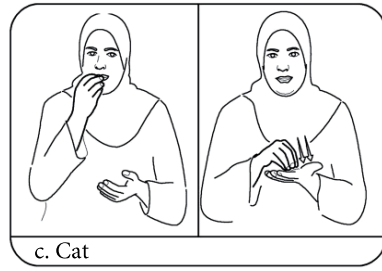
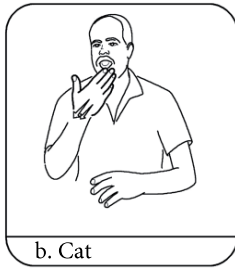
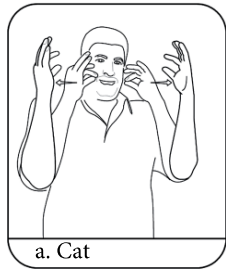
Bedouin community of 3500, with \approx 130 deaf members

ABSL: village sign language, used by deaf and hearing

- Stable word order (SOV, unless object is pronoun then it's SVO)
- Little use of space for inflection (about 10% of the time)
- Morphology: compounding

Meir, I., et al. (2012). The influence of community on language structure: Evidence from two young sign languages. *Linguistic Variation*, 12, 247-291.

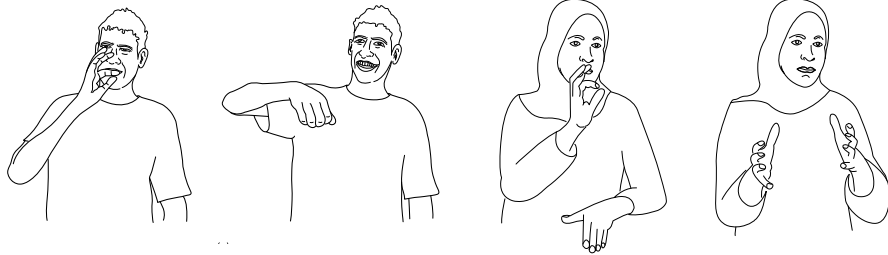
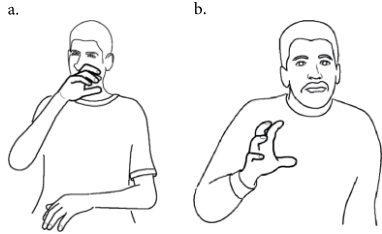




Substantial lexical variation, no phonology?

Substantial inter-speaker / inter-family lexical variation

- Perhaps as a result (?) no evidence of phonology-like sublexical regularities



Sandler, W. et al. (2014). Language emergence: Al-Sayyid Bedouin Sign Language. In N. J. Enfield et al. (Eds.) *The Cambridge Handbook of Linguistic Anthropology* (pp. 250-284). Cambridge: CUP.

Patterned Iconicity



'handsaw'
handling (lexical)



'handsaw'
instrument (lexical)



'spoon'
handling



'spoon'
instrument

- Use of handshape for systematic distinction between nouns and verbs
- See in ASL, rapidly emerges in ABSL, present but much less sharp in non-signers

Nicaraguan Sign Language



Formed in schools for the deaf in Managua since the late 1970s. Current population of ≈ 3000 deaf members



- Evolving word order (broadly verb-final, but more complex when two animate entities involved, e.g. NVNV or NVVN)
- Increasingly systematic use of space for inflection
- Morphology: compounding
- Phonology?

A. Senghas, A. et al (1997). Argument structure in Nicaraguan Sign Language: The emergence of grammatical devices. In E. Hughes et al. (Eds.) *BUCLD 21*. Cascadilla Press.

Montemurro, K., et al. (2019). Grammaticalization of the Body and Space in Nicaraguan Sign Language. In M. M. Brown & B. Dailey (eds.) *BUCLD 43*. Cascadilla Press.

The emergence of conventions for more fine-grained distinctions



MAN

WOMAN

HIGH-FIVE

Symmetrical



MAN

WOMAN

PUNCH

GET-PUNCHED,

PUNCH

GET-PUNCHED.

Reciprocal

Gleitman, L., et al. (2019). The emergence of the formal category “symmetry” in a new sign language. *Proceedings of the National Academy of Sciences, USA*, 116, 11705-11711.

What does this tell us about language origins?

- Language emerges fast (in communities of modern humans)
- It needs a community
- Maybe stable lexicon, compositionality, stable word order established very early (as in homesign)?
- But gradual process of conventionalization, systematization (patterned iconicity, duality of patterning) and grammaticalization unfold over many generations

The problem with natural experiments

Some disagreement over core elements of the findings (e.g. potential influence of other established sign languages on Nicaraguan Sign Language)
Surprising amount of disagreement over the interpretation of these findings!
e.g.

- Me: A beautiful example of how learning and use create structure
- “It has long been postulated that language is not purely learned, but arises from an interaction between environmental exposure and innate abilities. The innate component becomes more evident in rare situations in which the environment is markedly impoverished. ... sequential cohorts of interacting young children collectively possess the capacity not only to learn, but also to create, language” (Senghas & Coppola, 2001, p. 323)

See this week’s tutorial

Course outline in retrospect

Week	Topic
1	Introduction
2	<i>Strike</i>
3	Natural selection, adaptation and language
4	Intention and structure in animal communication
5	<i>No class</i>
6	Social learning and cumulative culture
7	Evolution of vocal learning and grammar learning
8	Evolution of social cognition
9	Cultural evolution of language
10	Sign language and language origins
-	Gene-culture co-evolution

Produces adaptations

Some but not much?

Human social / technological niche

Important cognitive innovations:
vocal learning, sequence learning,
compositional grammar learning

Important cognitive
innovation: mindreading

How transmission produces
linguistic structure

Natural selection responds

Recent review articles

Smith, K. (2022). How language learning and language use create linguistic structure. *Current Directions in Psychological Science*, 31, 177-186.

Smith, K. (2020). How Culture and Biology Interact to Shape Language and the Language Faculty. *Topics in Cognitive Science*, 12, 690–712.

Kirby, S. (2017). Culture and biology in the origins of linguistic structure. *Psychonomic Bulletin & Review*, 24, 118–137.

Tamariz, M. (2017). Experimental studies on the cultural evolution of language. *Annual Review of Linguistics*, 3, 389–407.

Next up

- Final tutorial
 - Sign language emergence: adults or kids?