



Talk 6th Nov 2024 - F.21 in 7 George Square

Cat Hobaiter (University of St Andrews)

Reimagining the study of great ape communication

ABSTRACT: In the Wild Minds Lab our work explores the communication and cognition of wild apes and other species. Like most researchers interested in the communication of other species, we explore the different signals great apes use, asking questions such as, how do they combine them? And, what do they mean? At the end of the day, we do this because we are interested in what it means to be a chimpanzee, or a gorilla, or a human. And systems of communication give us a framework through which we can investigate what individuals of other species, and our own, are thinking and feeling. But—to date—the ways in which we have studied communication, asking what tools each species has in their tool kit, might not be well suited to understanding how communication is used by individuals, groups, and cultures across species. I will describe how we are reimagining the study of non-human communication, re-building the units of communication from the bottom-up and taking a species-centric perspective to parsing them, as well as integrating social context and relationships. We hope this will help us to better understand communicative structures in other species, and—in turn—the evolutionary origins of our own.

Origins and Evolution of Language Week 8: Sign language as a window into language origins

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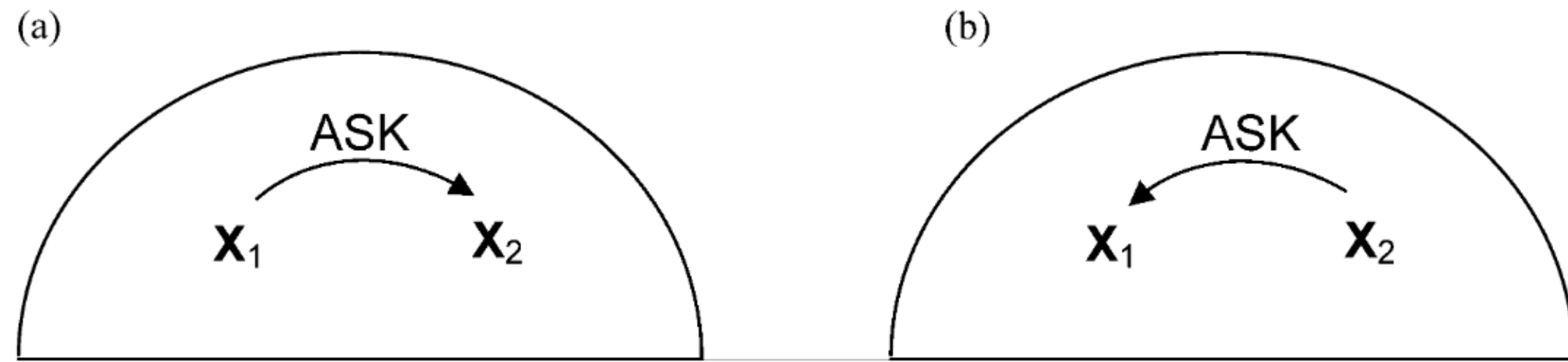
4th November 2024

Goal: show how data from different signing practices is used to inform language evolution research

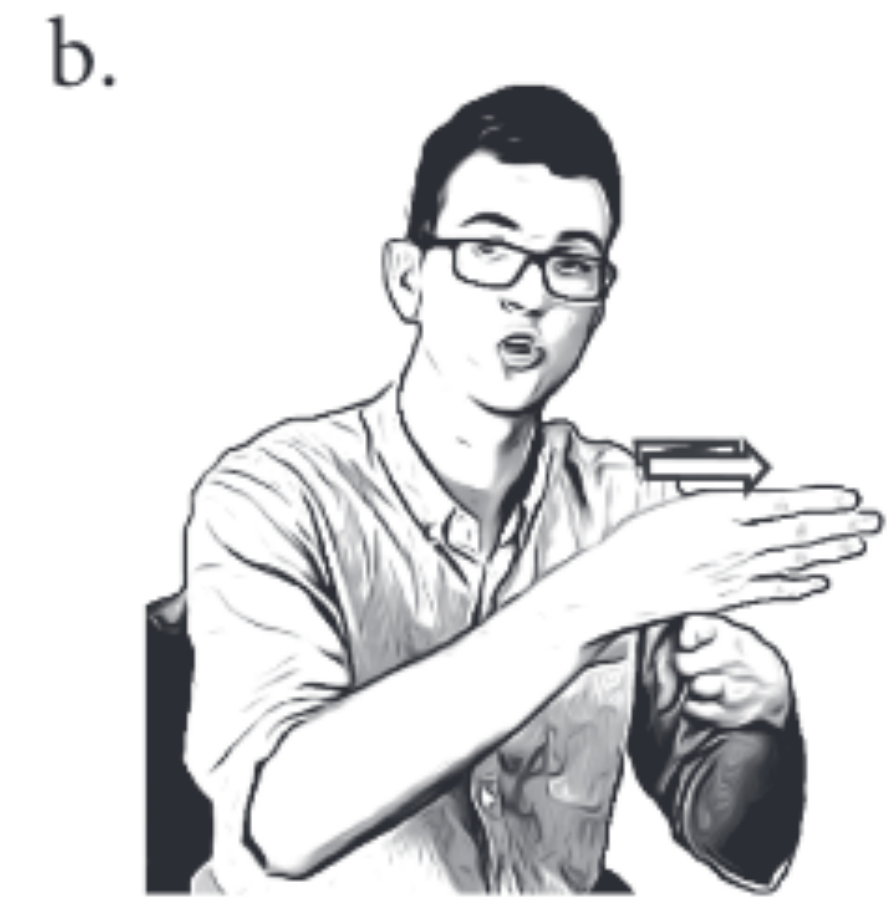
Data from signing practices

- Phonology, arbitrary and conventional lexicons, morphology, syntax, rich sociolinguistics etc.
- Different solutions to communication and expressivity challenges afforded by the visual-manual modality

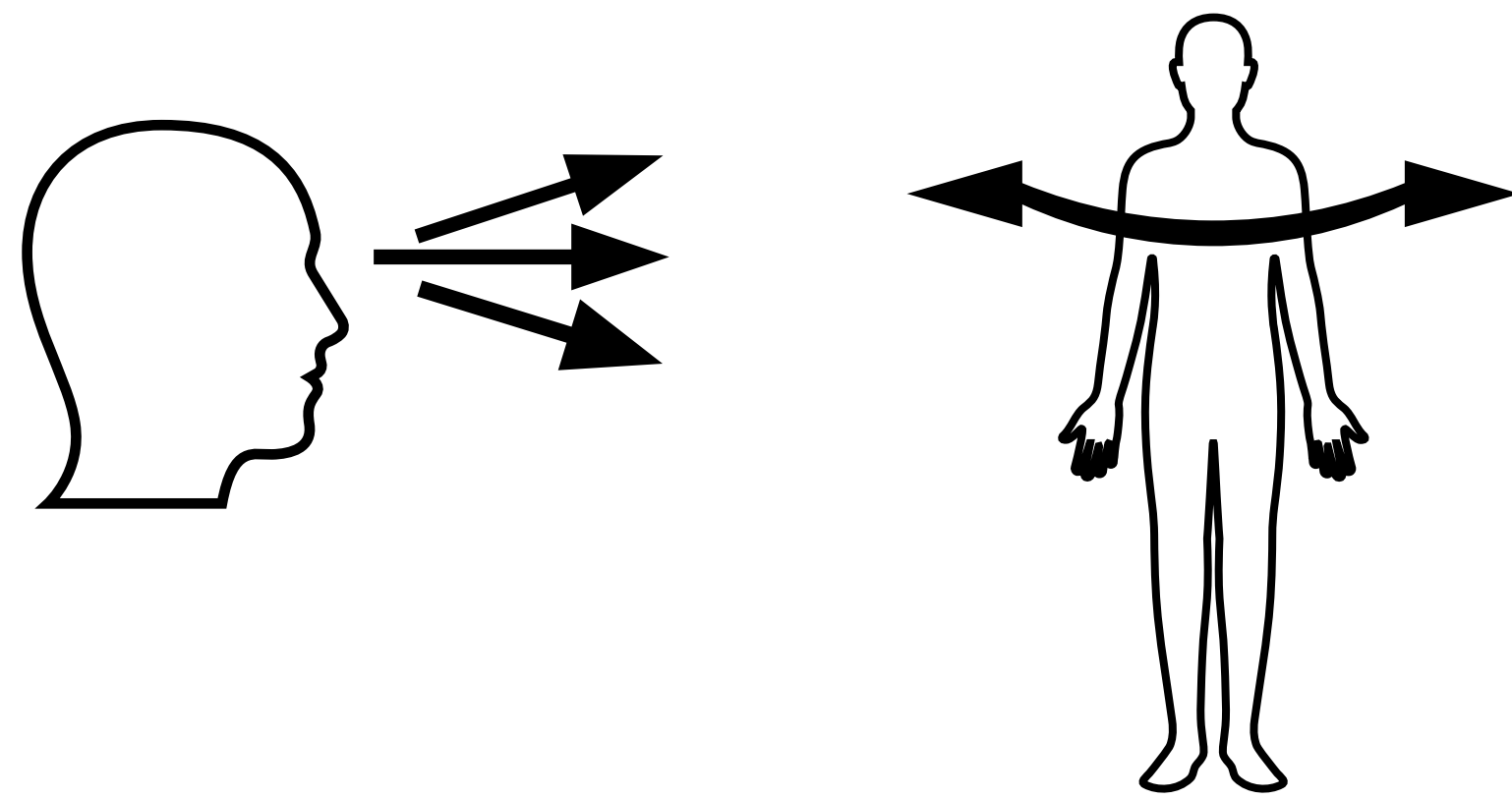
Phonology highlights



'handsaw'
handling (lexical)



'handsaw'
instrument (lexical)



a.



b.



Basic Word Order

Spoken:

- English: SVO - ***Kenny teaches OEL***
- Maori: VSO - ***kei te whai te ngeru i te kiore*** “**the cat is chasing the mouse**”

Signed:

- Finnish Sign Language: SOV - ***BOY APPLE BUY***
- Brazilian Sign Language: SVO - ***JOHN LIKE SOCCER***

Zipf's Law of Abbreviation: Spoken and signed

- More frequent words tend to be shorter

Zipf's Law of Abbreviation: Spoken and signed

'No'

'Adventure'

'In'

'Conversation'

'Her'

'Information'

Zipf's Law of Abbreviation: Spoken and signed

'No'



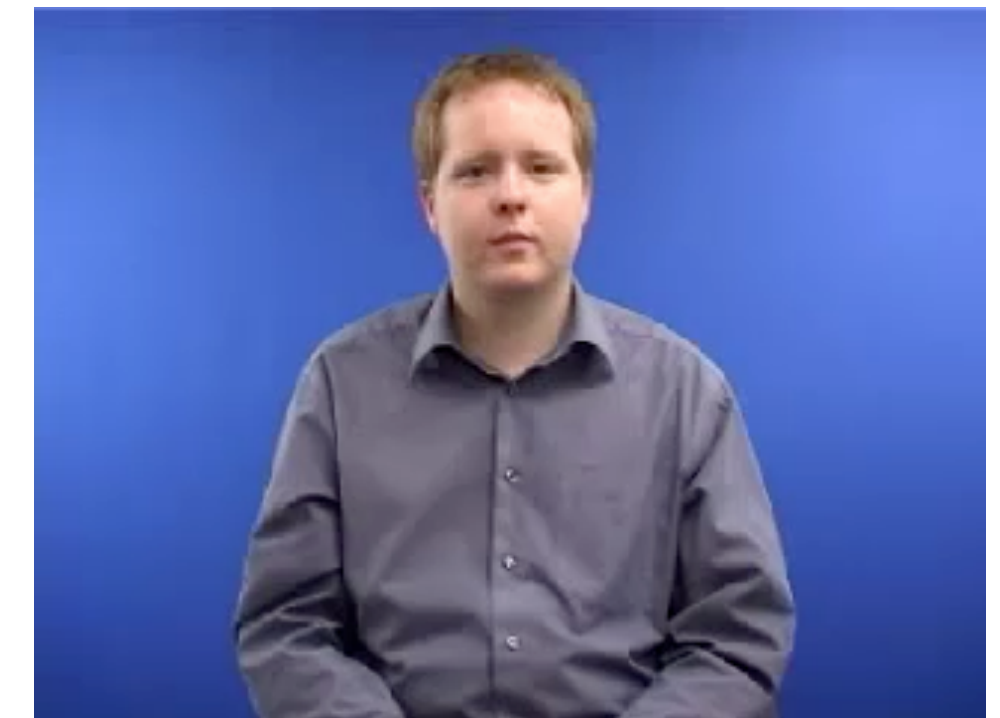
'Adventure'



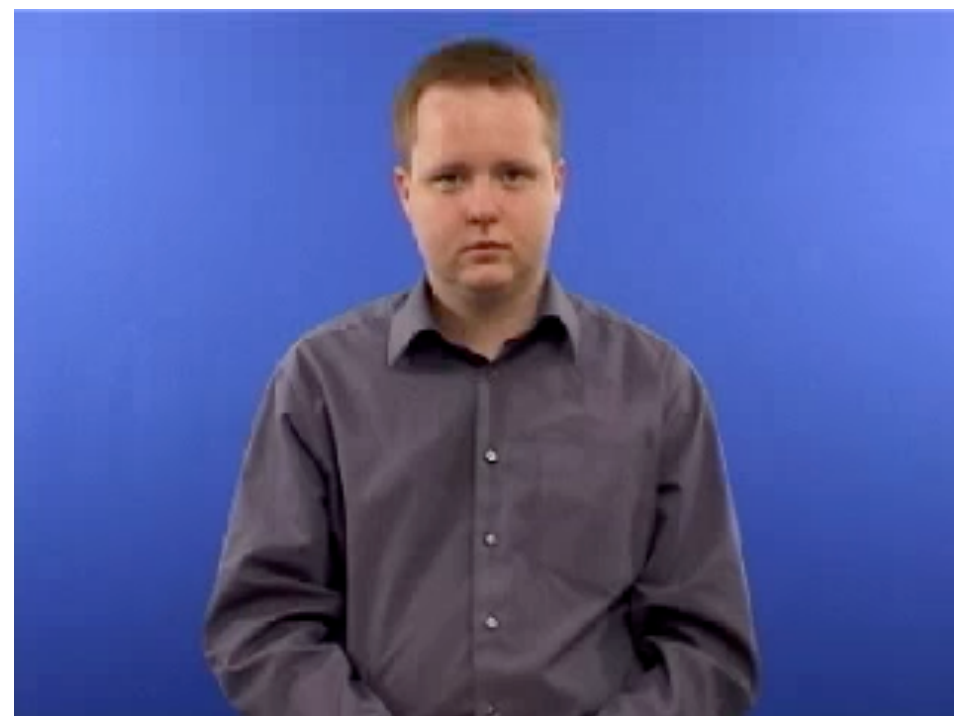
'In'



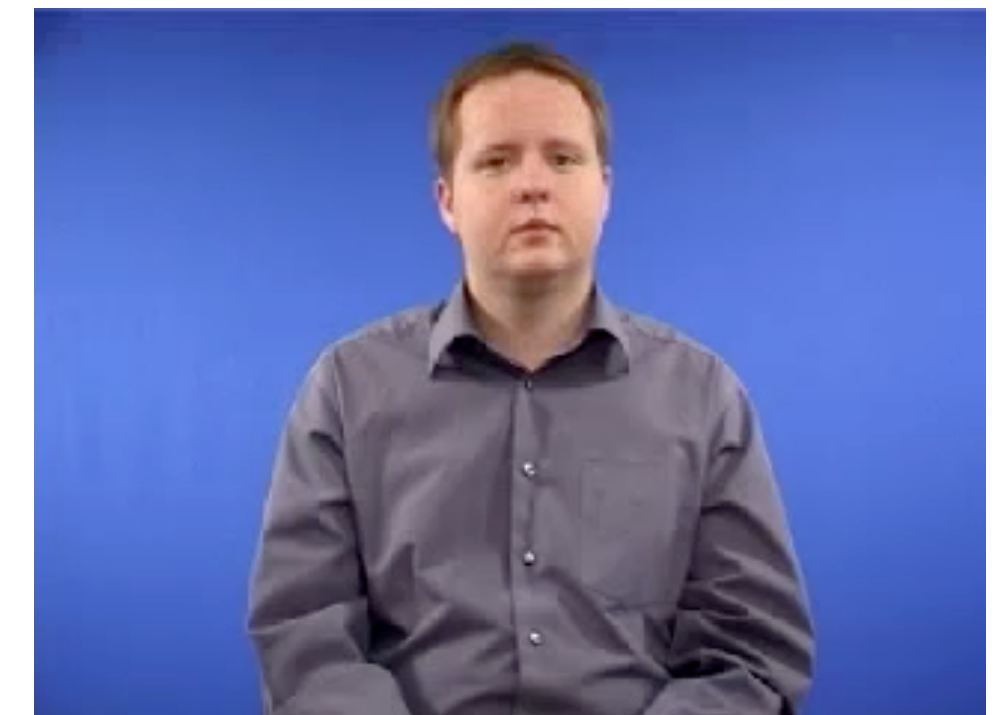
'Conversation'



'Her'



'Information'



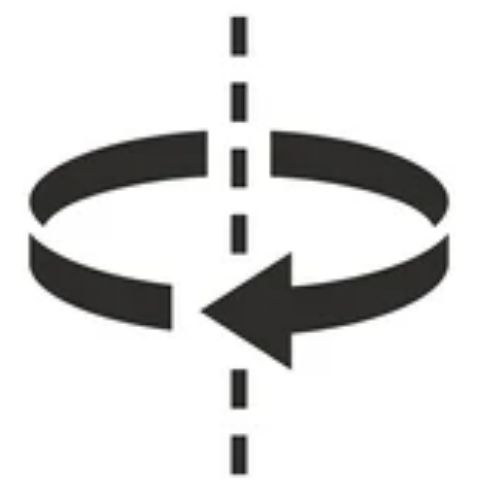
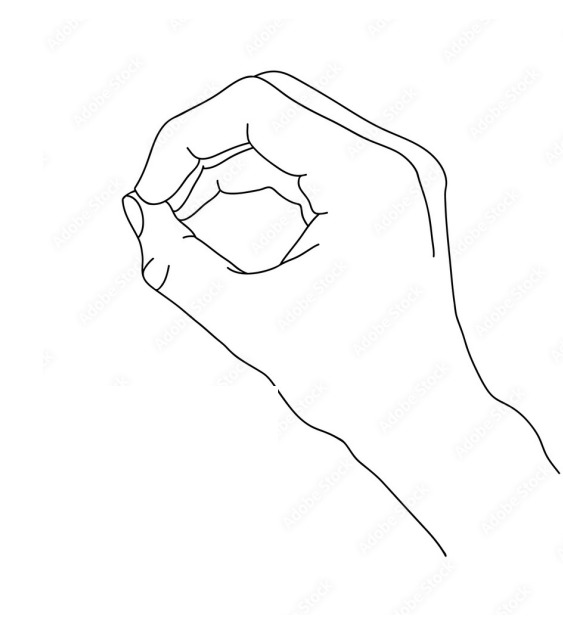
Range of signing practices

Signing practices: home sign/homesign

- Children experiencing language deprivation
- Used in the home and close community
- Little structural influence from parents/caregivers
- Poor caregiver comprehension

Home sign

- Lexicon: stable and iconic
- Use of pointing and eye-gaze
- Syntactic structure: *APPLE EAT*
- Combinatorial structure
- Various markers



Questions:

Is it possible that homesigns have necessarily become more flexible in their representation of nominals and predicates because they are communicating with non-users of the language in the hearing community who may not understand?

- Varied handshapes to “cover options”
- Little evidence for communication-based motivation

Questions:

How does this relate to the origin on language?...is it about homesign being analogous to the first stage of language, why wouldn't the first "home-speaker" be able to speak with anyone else, considering they have the same cognitive abilities as him/her?

- Tells us more about evolution
 - Repeated use vs. repeated learning
 - Need for community
- Major differences between homesign and language origin
 - Not just cognition
 - Shared sensory experience
 - Lack of any language model

Signing practices: National sign languages

- National sign languages: BSL, LIS, Auslan, ASL etc.
- BSL: around 151,000 people in the UK
- French Sign Language (LSF) -> American Sign Language (ASL) with influence from local languages
- Taught in schools and at home
- Recognised national languages*

* National status is not ubiquitous, impact on accessibility

Signing practices: Sign languages in smaller communities

- High levels of hereditary deafness
- Used by generations of both hearing and deaf individuals
- Close familiar social context
- Shared sign languages
- ~~Have been claimed to emerge in “vacuum”~~

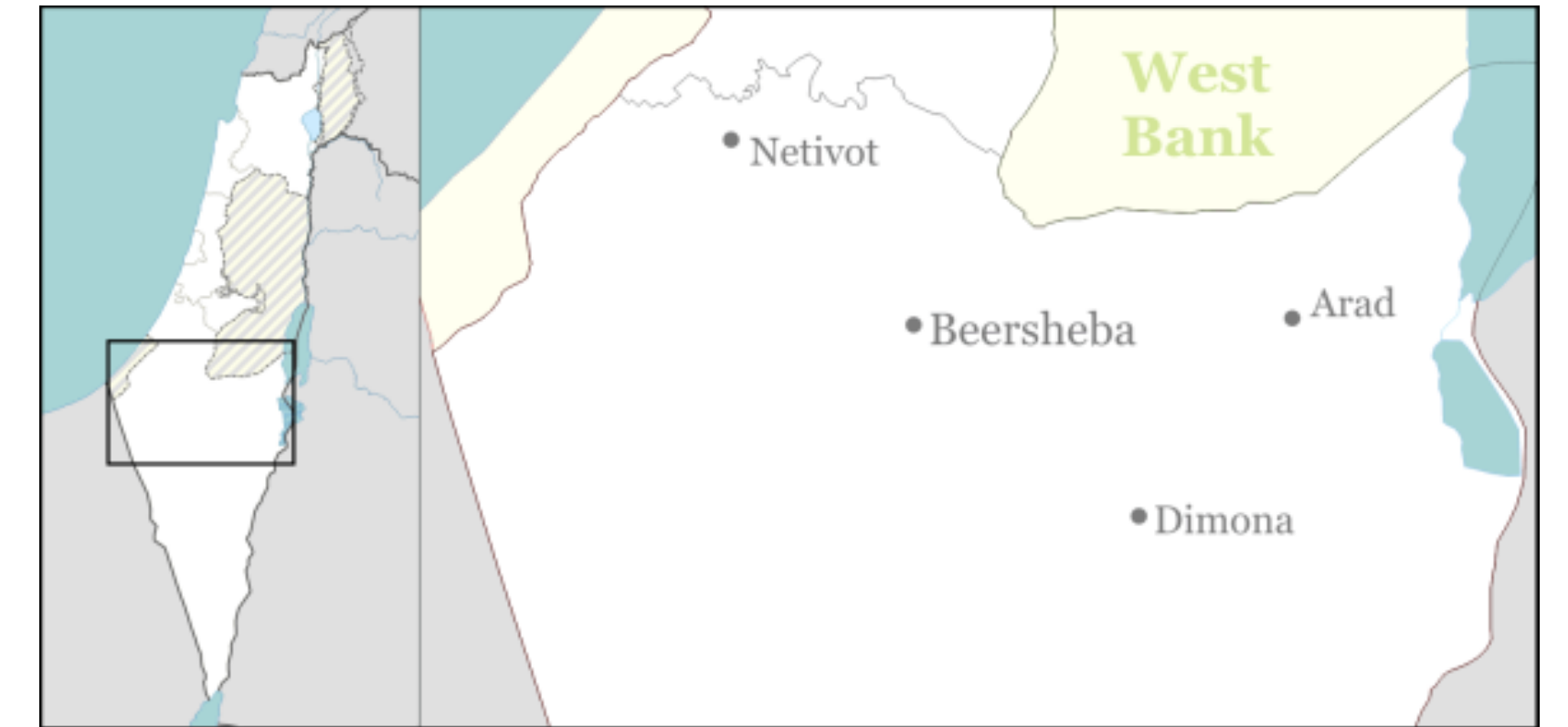
Kata Kolok (Bali)

Central Taurus Sign Language (Taurus Mountains, Turkey)

Al-Sayyid Bedouin Sign Language (Negev desert, Israel)

Al-Sayyid Bedouin Sign Language: Negev desert, Israel

- Bedouin community of 4,500 people
- About 130 deaf individuals
- Bi/multilingualism is norm
- Differences in schooling for different age-groups



Al-Sayyid Bedouin Sign Language

- Fairly stable word order (mainly SOV)
 - Different from other surrounding languages
- Limited use of space for inflection



Signing practices: Sign languages developed in a school

- Can emerge in both oralist and signing schools
- Community often from a wider geographical region
- Passed to younger “cohorts” of students
- Learned by school-aged children or older
- Knowledge of local language, e.g. written

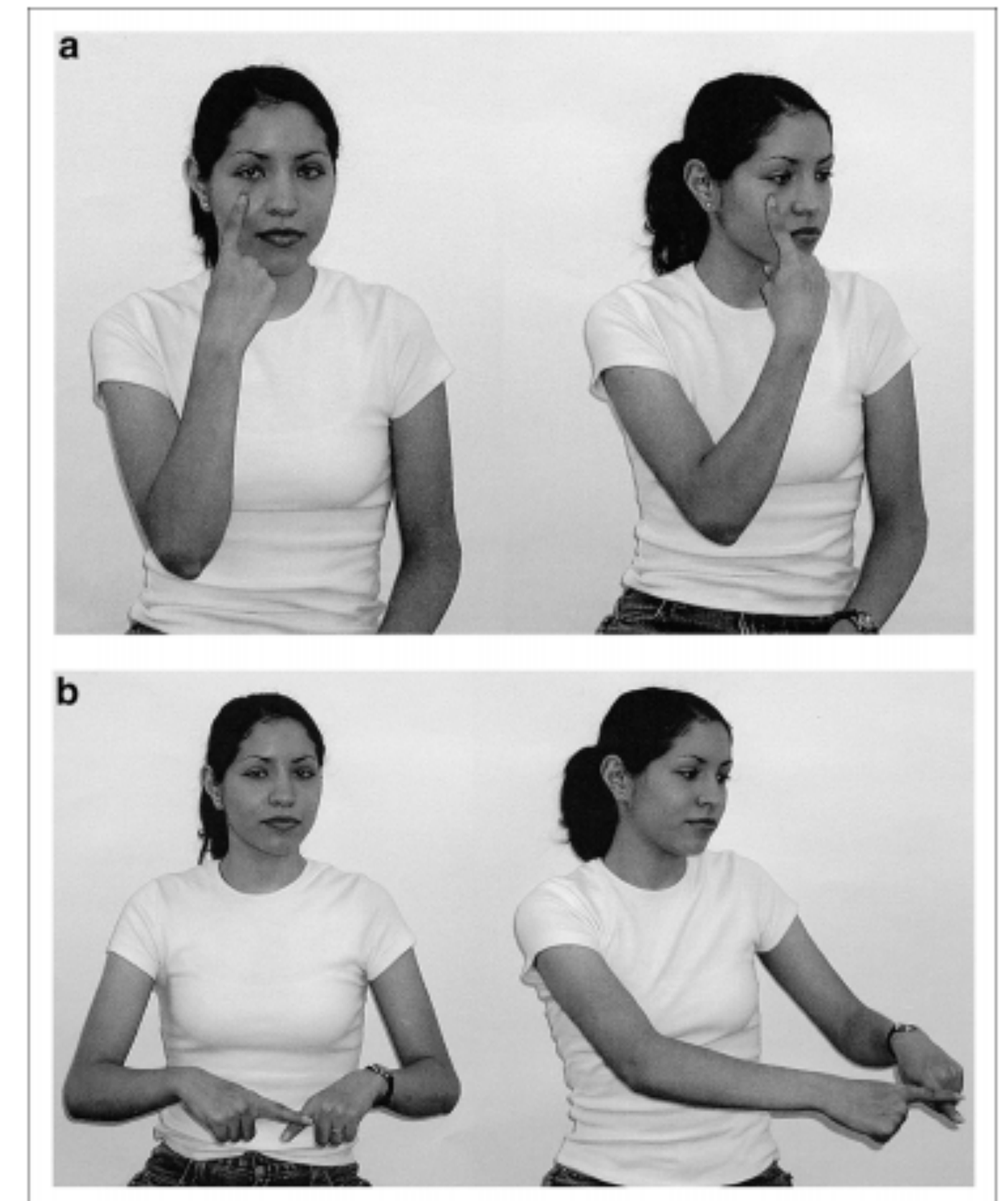
Nicaraguan Sign Language: Managua, Nicaragua

- Originated in an oralist school in 1977
- Influence from home sign systems of students
- Passed to new “cohorts” of students
- Now 3,000 native NSL signers



Nicaraguan Sign Language

- Varied word order (verb final, but often verb doubling or sandwiching)
- Expanding use of space for inflection/agreement
 - Note difference with ABSL data



Questions:

I wonder how hard it would be for a mature homesigner to integrate him or herself into a sign language community with an already agreed-upon consensus for the specific kinds of handshapes used for lexical items, nominals, and predicates that the members of those communities' share?

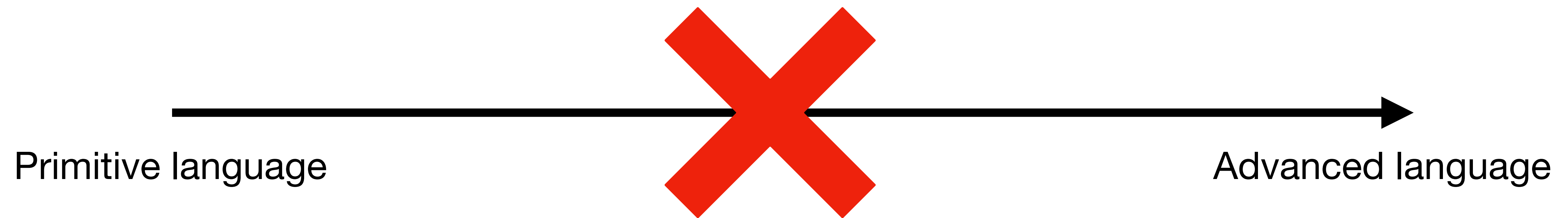
- Like second language learning
- Experience NSL cohort 1
- Earlier acquisition = higher fluency

Intermission: thinking about contexts

- Differences between the context in which NSL evolved/exists and the context in which ABSL evolved/exists?

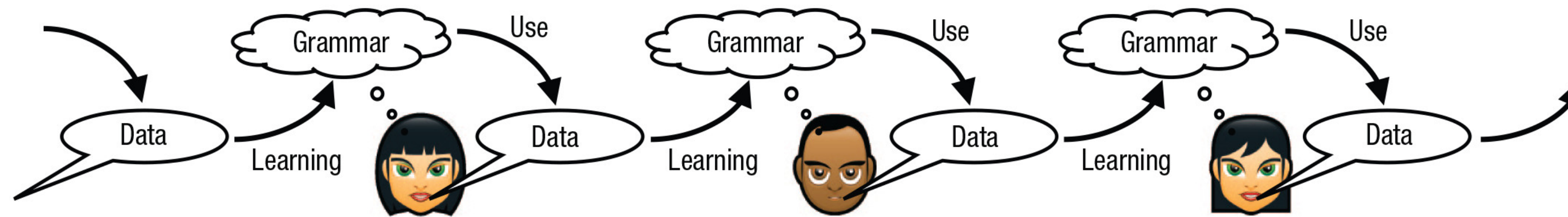
The view of language evolution

- The temptation to see evolution as “advancement”



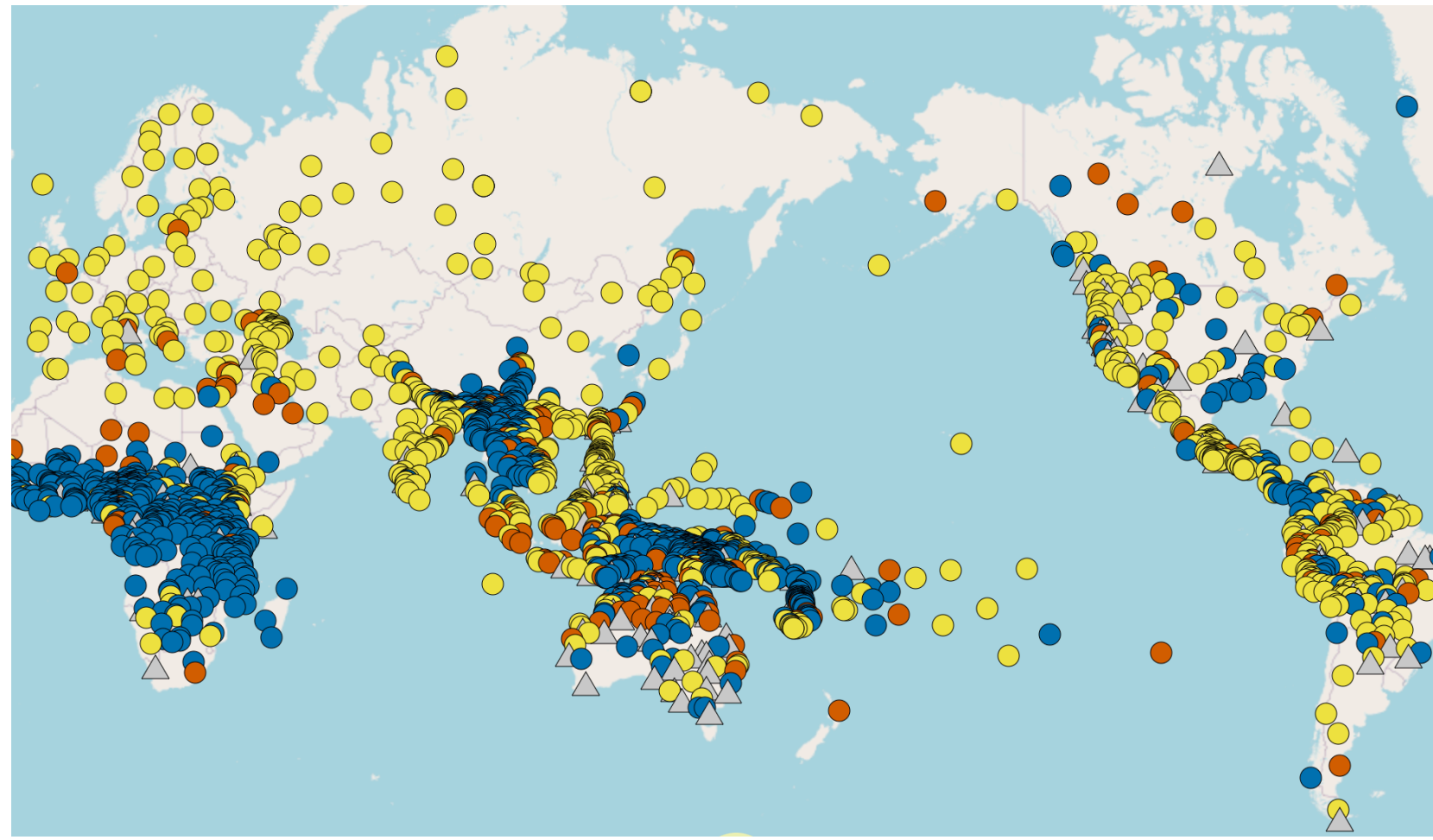
The view of language evolution

- Are we a bit obsessed with the notion of “young” languages?



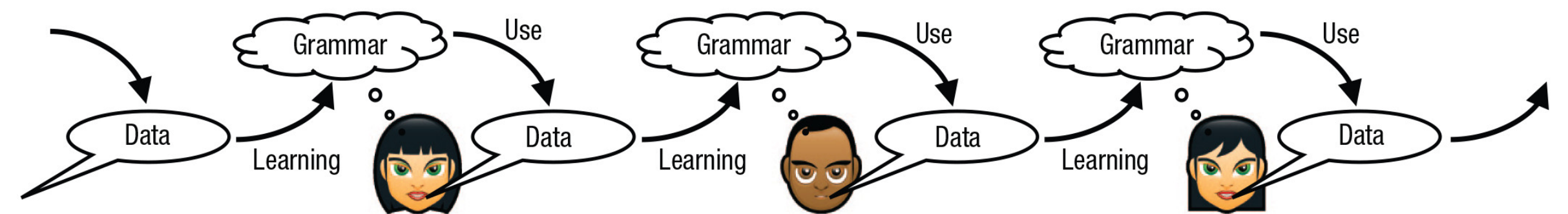
- Do we see differences depending on the time-depth of these processes?
- Do some features require only one of these?

How is data from various signing practices used in language evolution research?



How is data from various signing practices used in language evolution research?

→	wimaku	miniki	gepinini	□
	nihepi	wigemi	mahekuki	○
	wikima	nipikuge	hema	△
↗	miwiniku	pinipi	kihemiwi	□
	kinimapi	wikuki	kikumi	○
	miwimi	nipi	wige	△
↻	gepihemi	kunige	miki	□
	pikuhemi	kimaki	pimikihe	○
	mihe	winige	kinimage	△



Experimental methods: **Silent gesture**



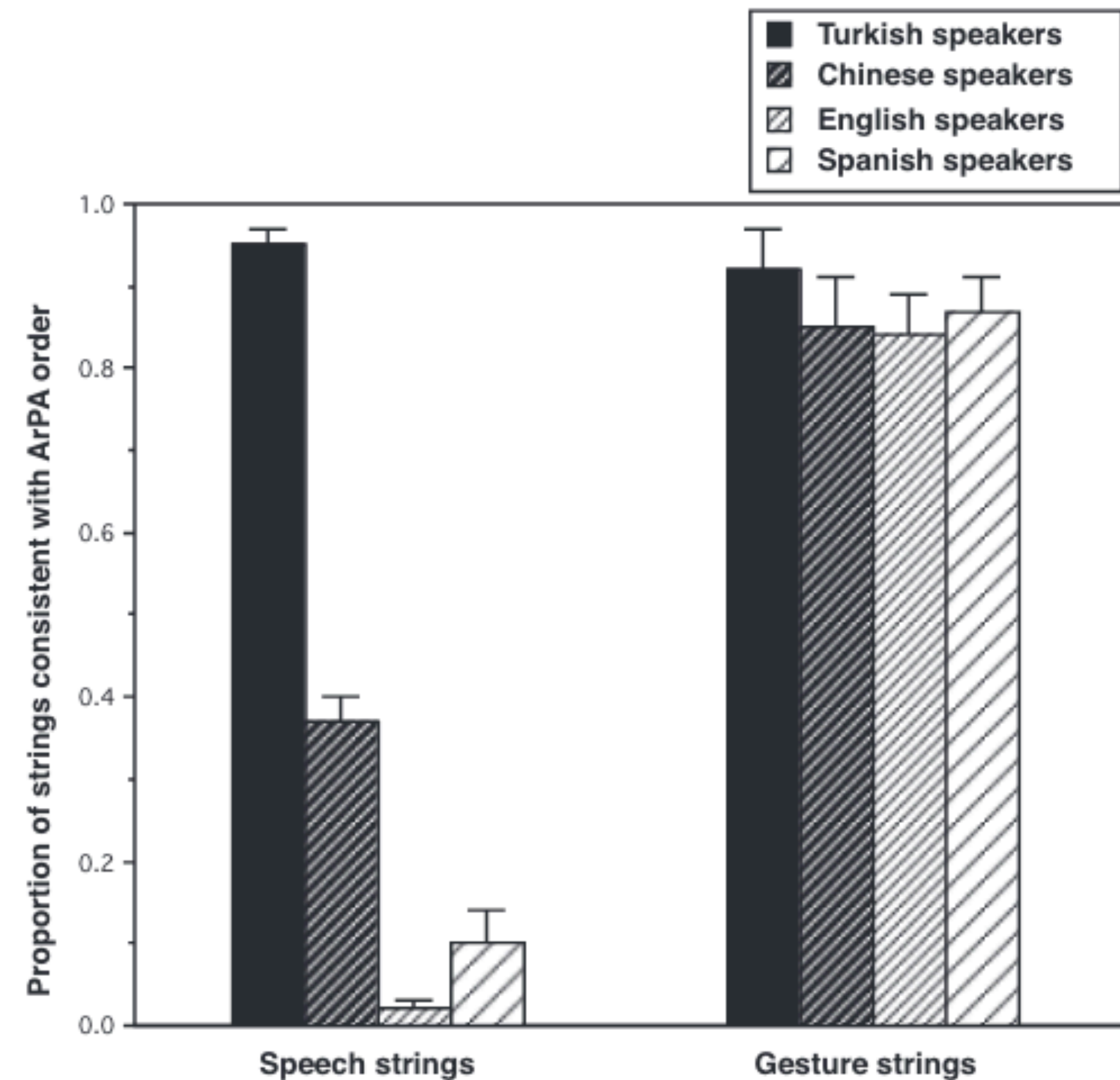
Frying pan

- Limit native language
- Iconic and easy to learn
- Parallel to signed languages*

*for modality, yes, but gestures are not systematic signs!

Silent gesture: Basic word order

- Goldin-Meadow et al. (2008)
- English, Spanish, Chinese (SVO) and Turkish (SOV)



Basic word order: Typology

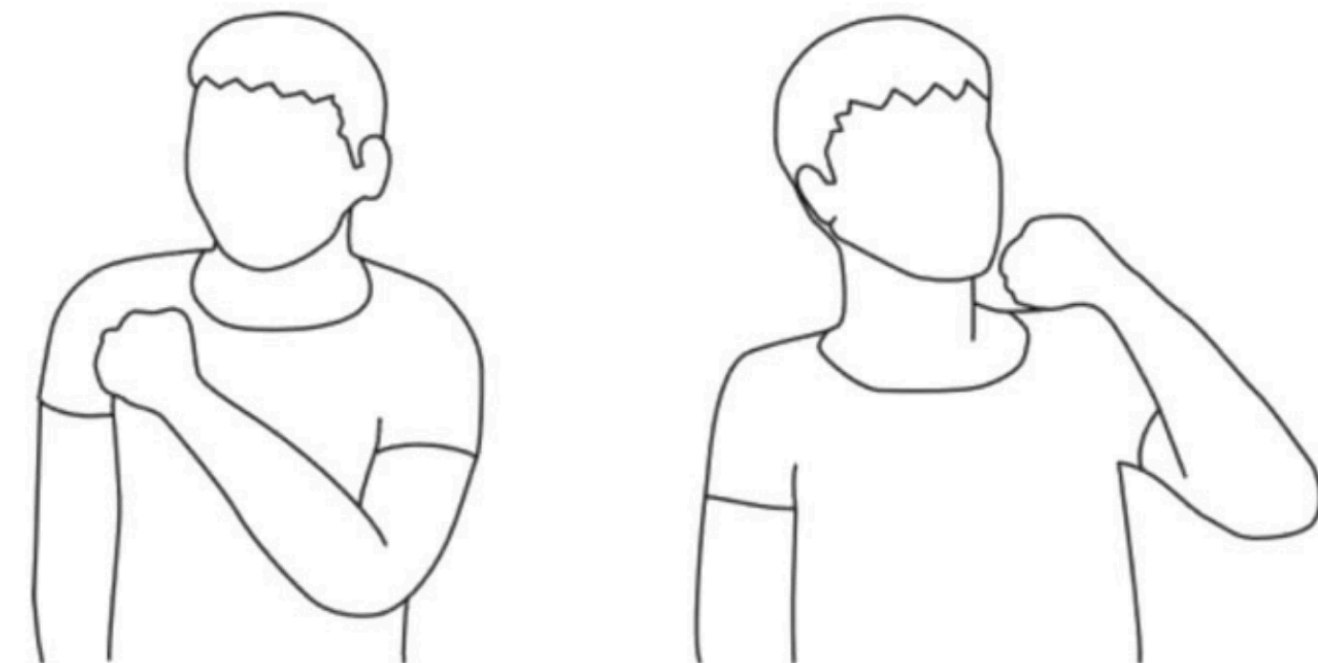
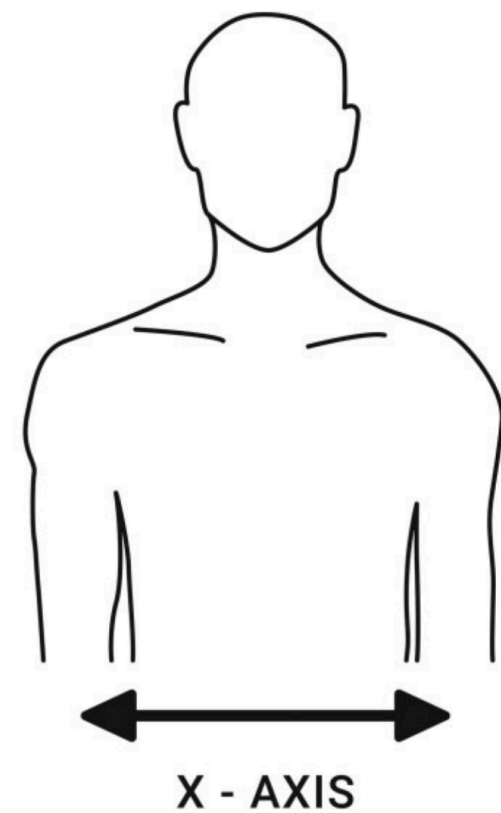
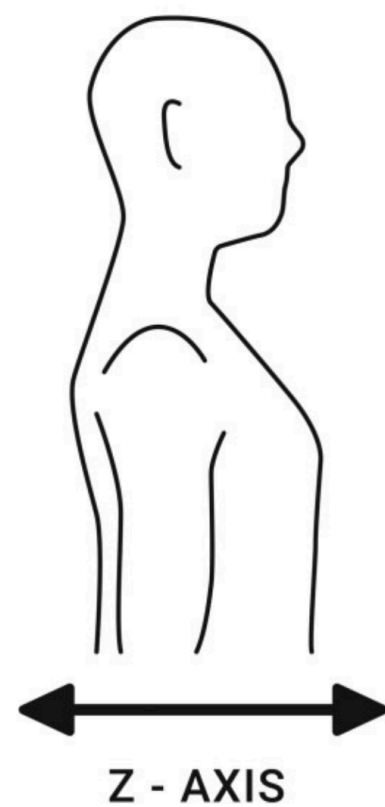
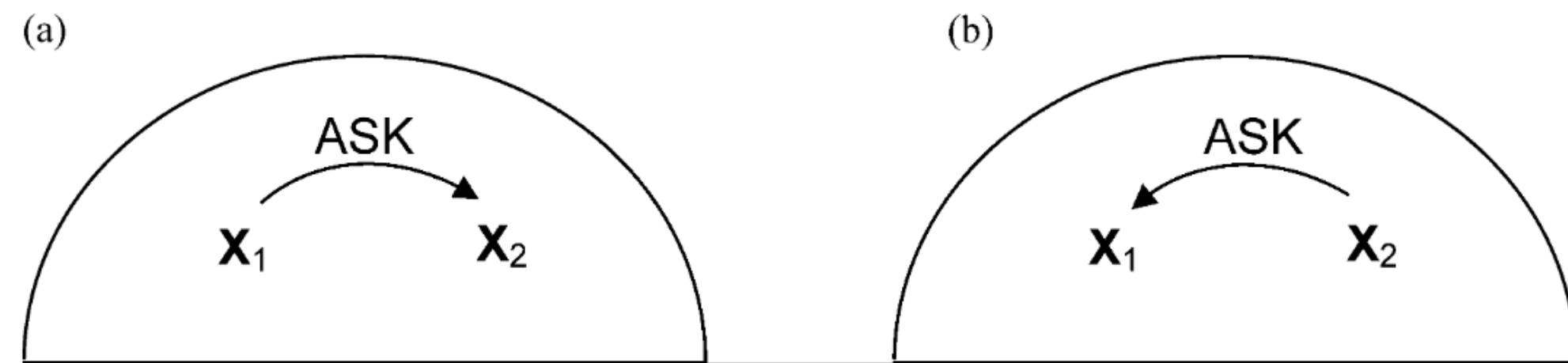
Order	Spoken
SOV	564
SVO	488
VSO	95
VOS	25
OVS	11
OSV	4
No dominant	189

Signed

- Napoli & Sutton-Spence (2014)
- SOV accepted in all 42
- Found in ABSL, NSL and OV for home sign
- Problem?
 - Phylogeny
 - Word order variability

Iterated learning: Predicate-argument

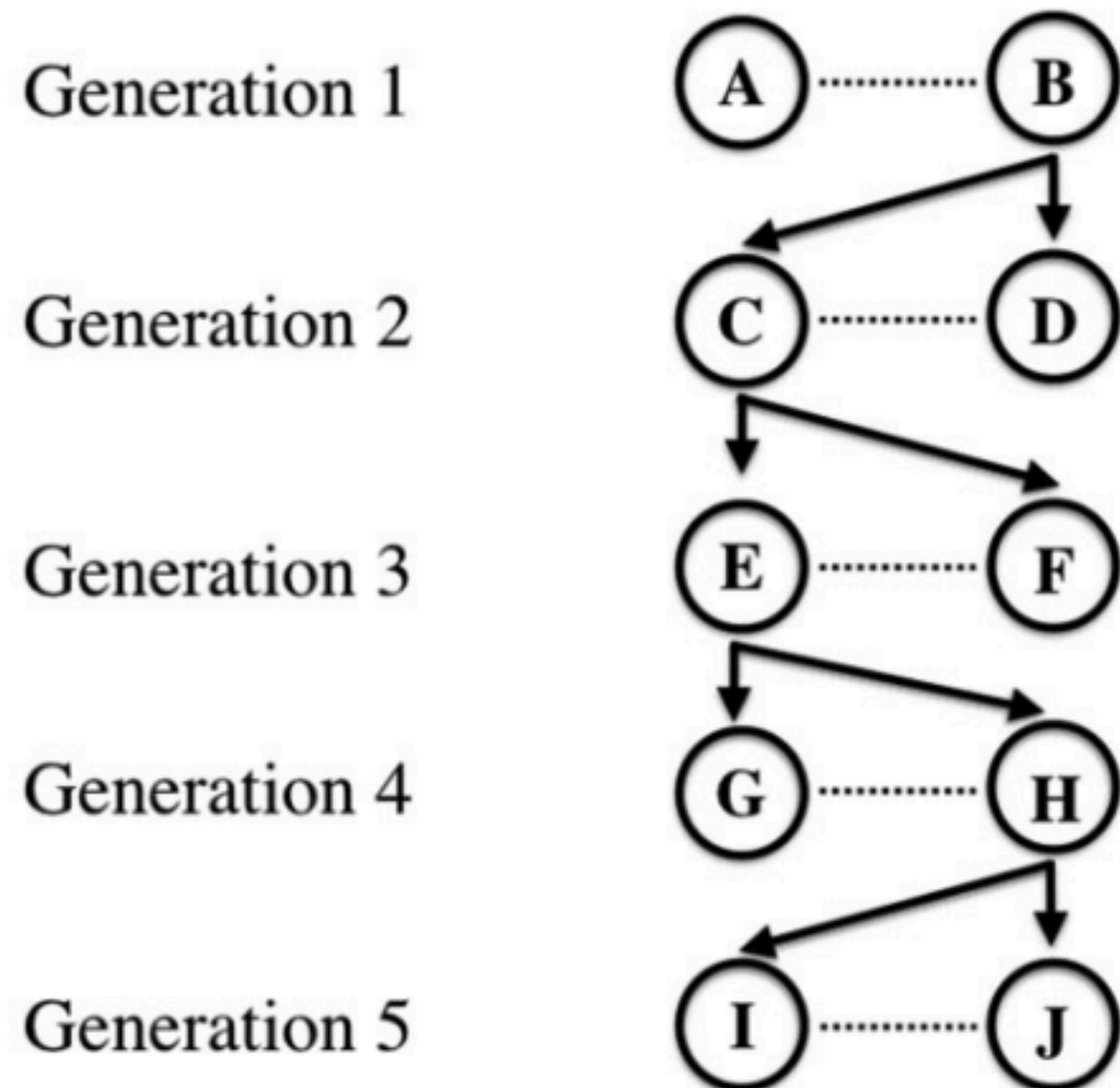
- Motamedi et al. (2021)
- Emergence of different strategies for distinguishing predicates and their arguments



MAN [SWINGS-FIST]; (body-shift) FIST-GRAZES-CHEEK
'The man swung at his cheek.'


- Iterated learning - express events in gesture
- First pair had to improvise
- Pairs of events: *Hannah is swinging. Sarah is walking.*

- All events has same actors.
- Second generation learned from one individual in previous generation.



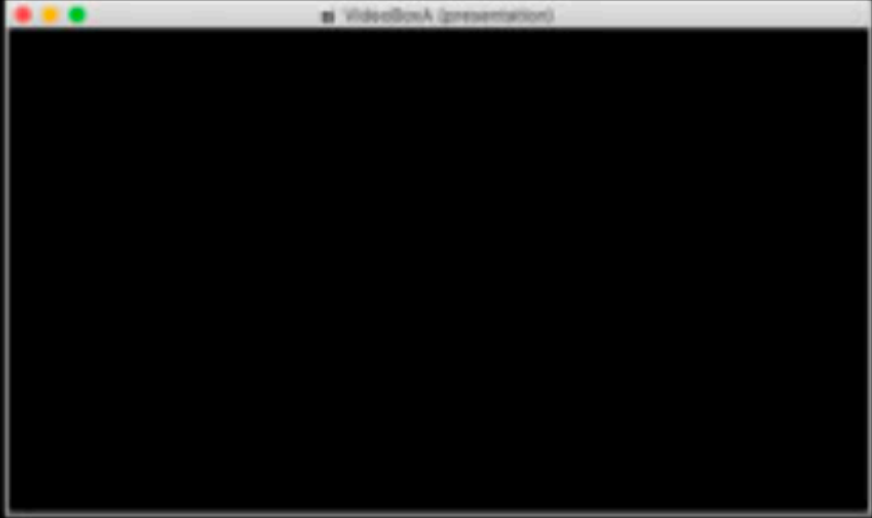
	TARGET PAIR	
		Hannah is helping Sarah Sarah is scolding Hannah
Foil 1. DIFFERENT VERB FROM CATEGORY		Hannah is praising Sarah Sarah is phoning Hannah
Foil 2. DIFFERENT AGENT CONFIGURATION		Hannah is helping Sarah Hannah is scolding Sarah
Foil 3. BOTH DIFFERENT		Hannah is praising Sarah Hannah is phoning Sarah

director view



Try to communicate the sentences below


Hannah is helping Sarah
Sarah is scolding Hannah



Your partner selected the right answer!

Hannah is helping Sarah
Sarah is scolding Hannah

matcher view



1 Hannah is helping Sarah
Hannah is scolding Sarah

Hannah is praising Sarah 2
Hannah is phoning Sarah

3 Hannah is praising Sarah
Sarah is phoning Hannah

Hannah is helping Sarah 4



Correct!

1 Hannah is helping Sarah
Hannah is scolding Sarah

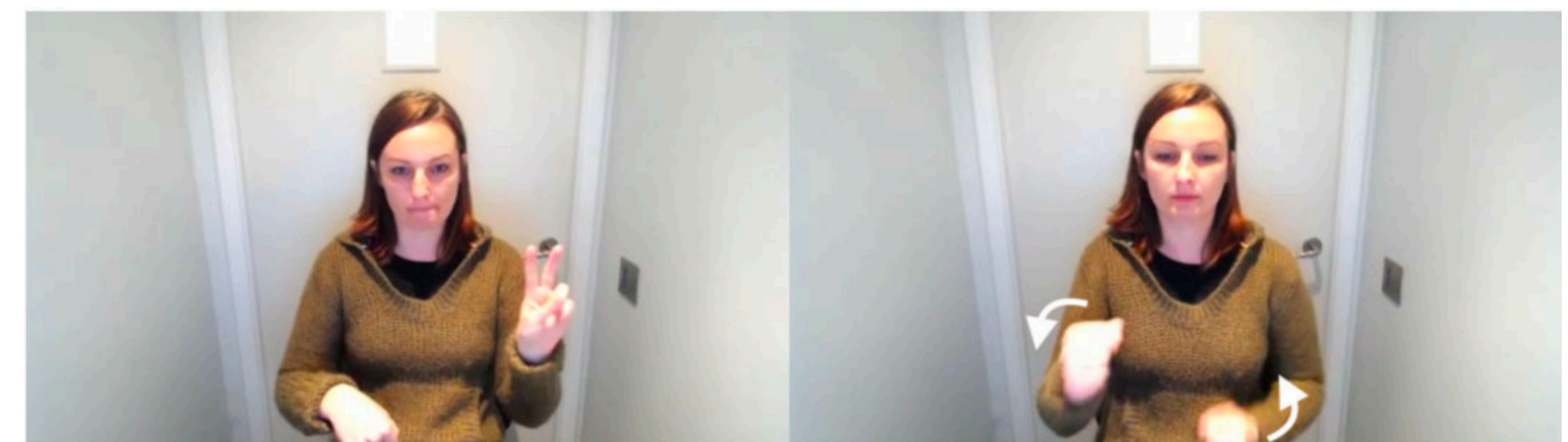
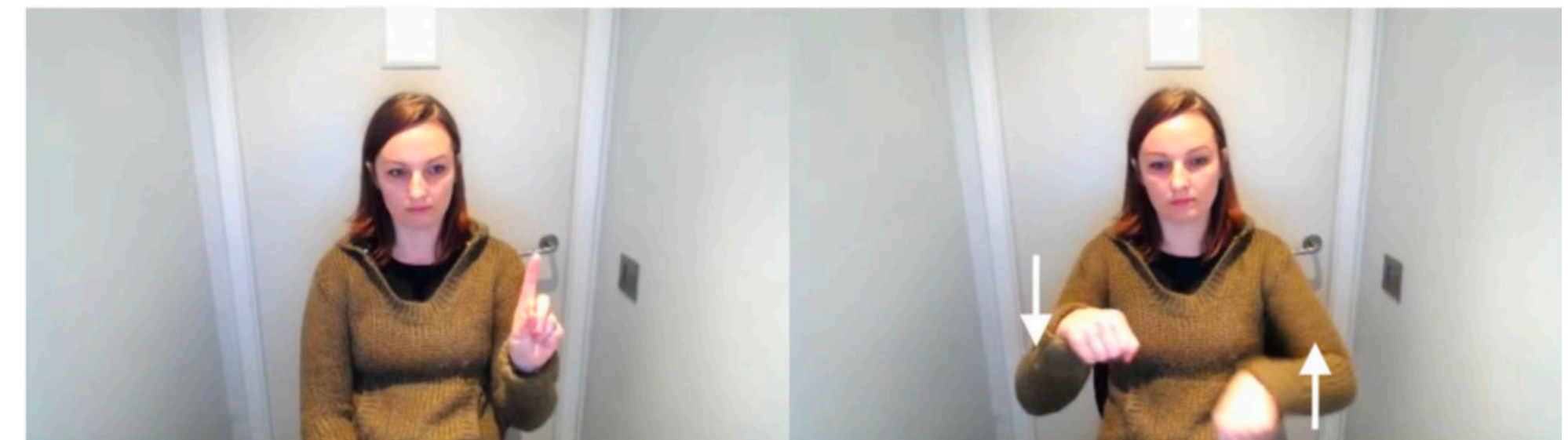
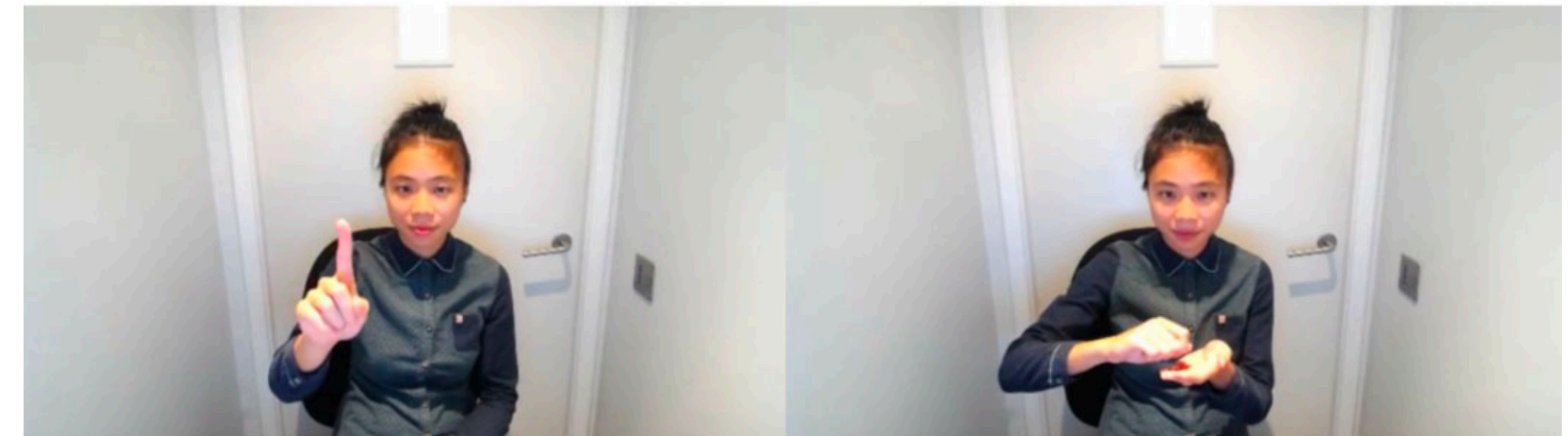
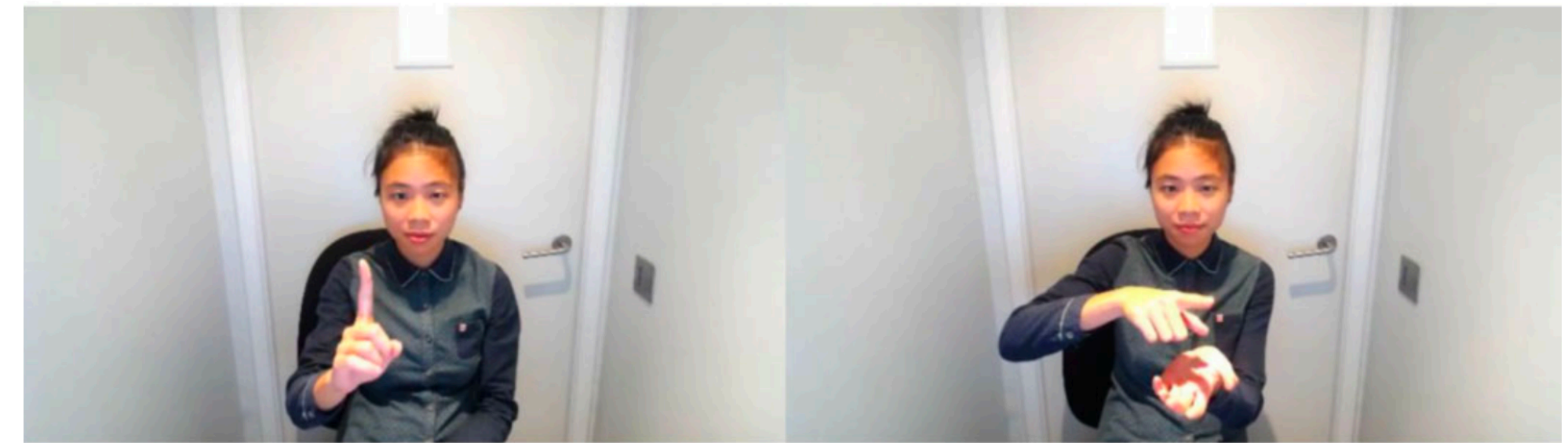
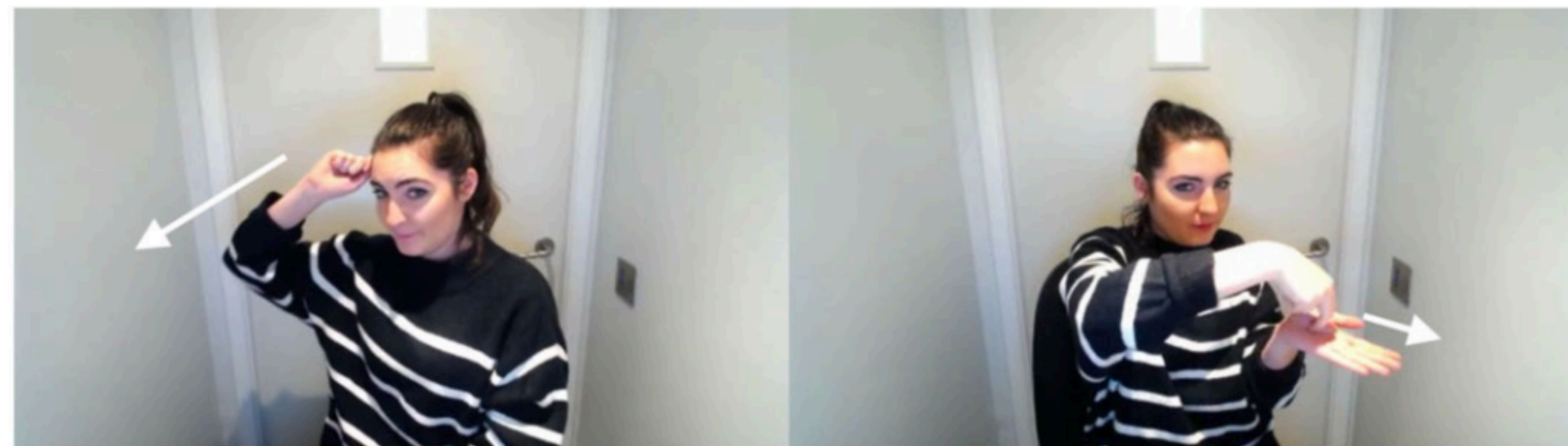
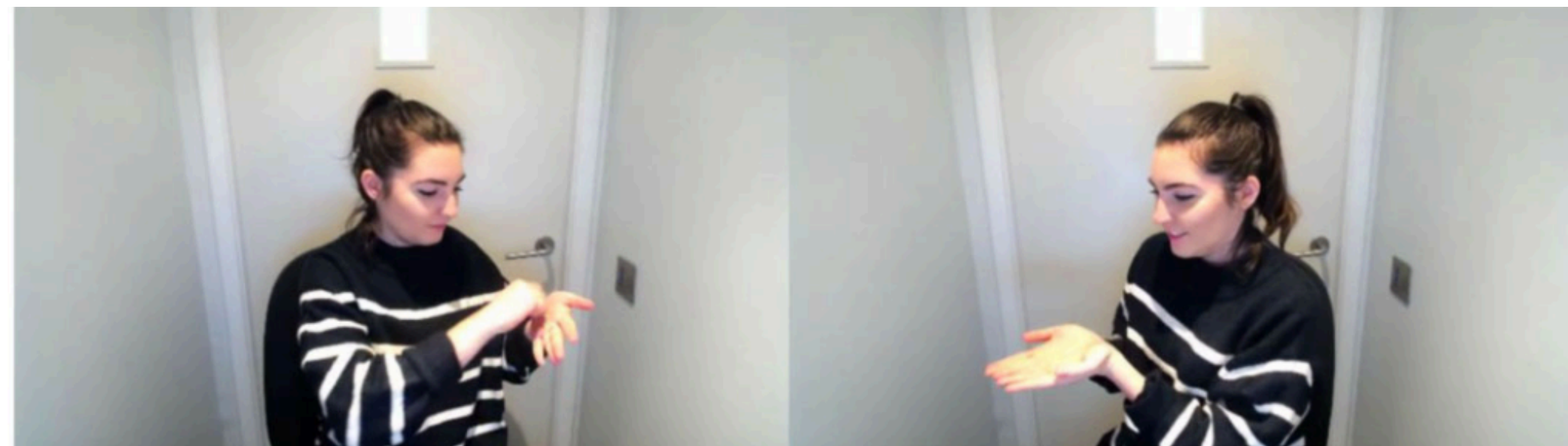
Hannah is praising Sarah 2
Hannah is phoning Sarah

3 Hannah is praising Sarah
Sarah is phoning Hannah

Hannah is helping Sarah 4
Sarah is scolding Hannah

Results: strategies

- Body-shift strategies
- Lexical strategies



Results: strategies

- Indexing strategies

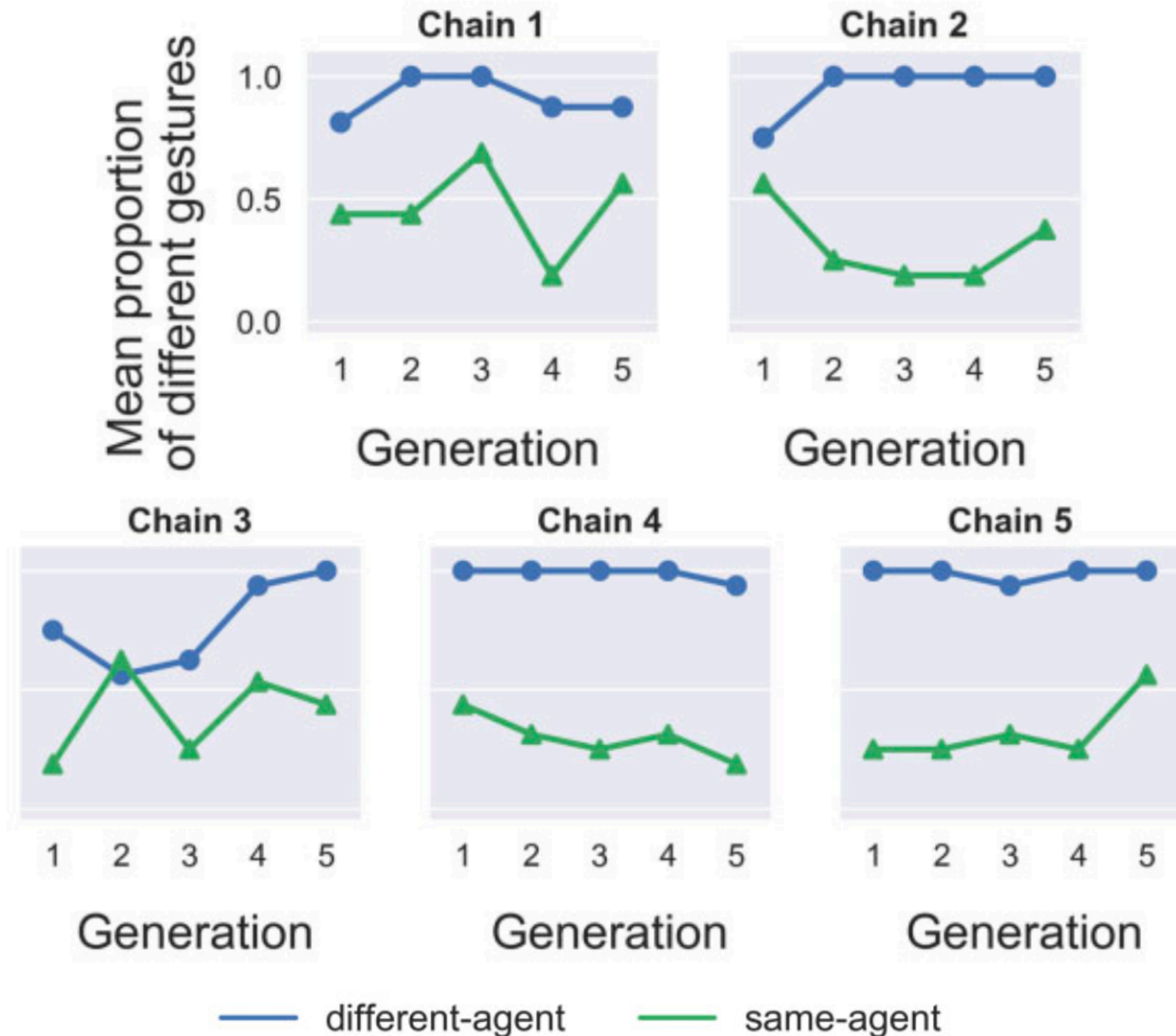
(a)



(b)



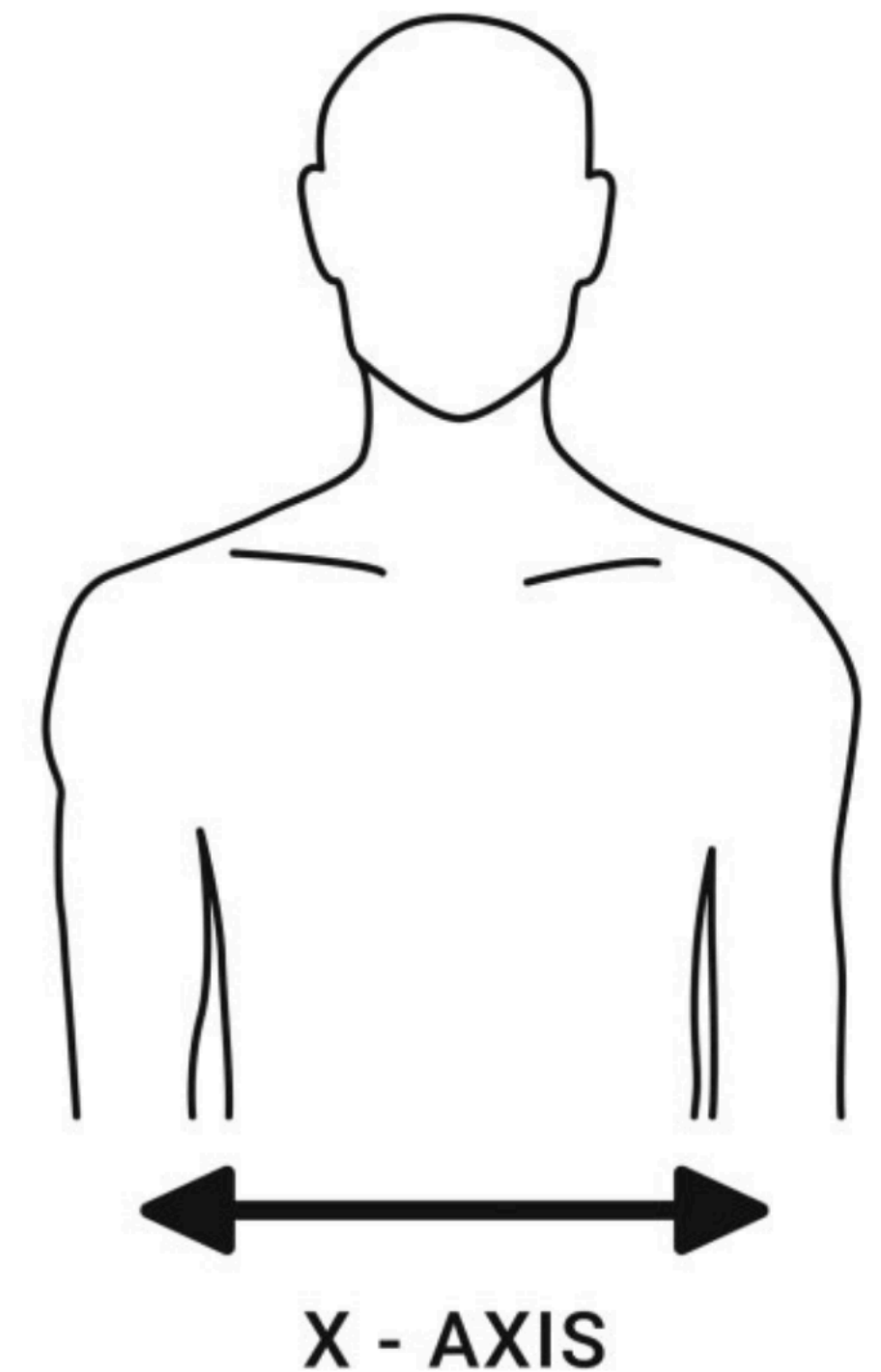
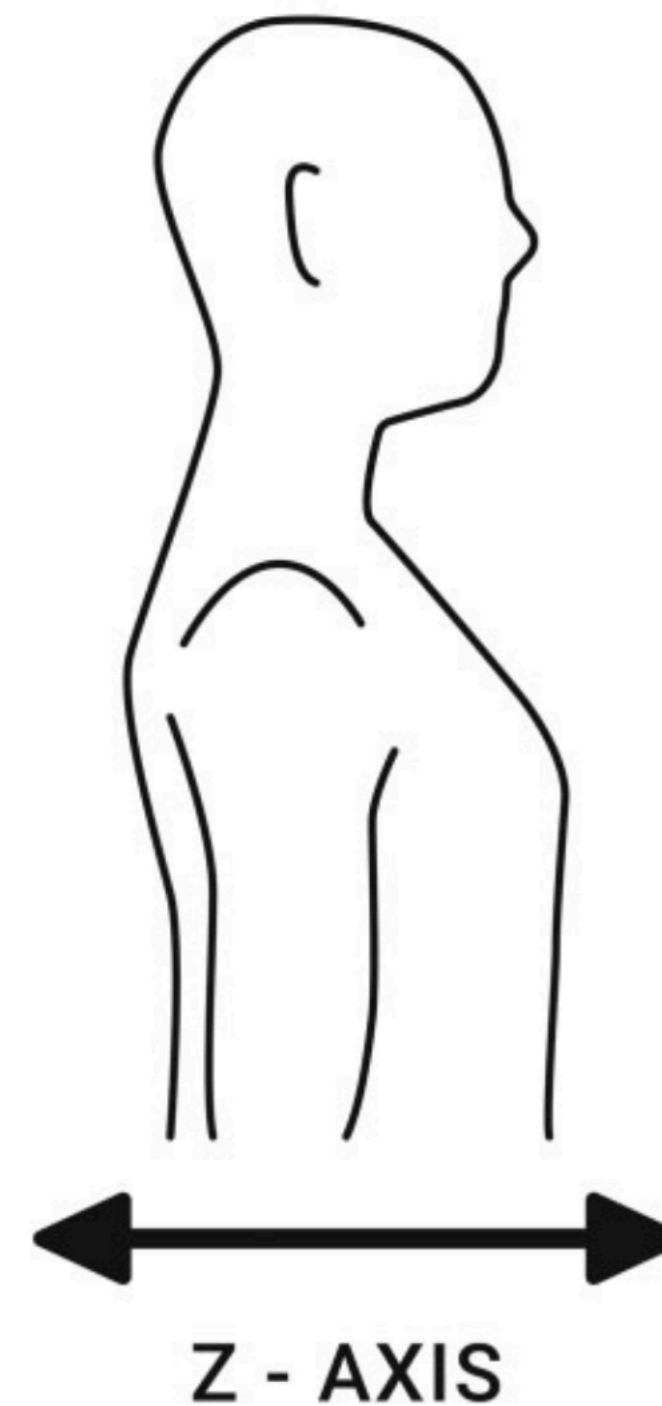
Results: generations



- Difference between conditions
- Interaction between condition and generation
- Frequency of agent differentiation increased in different agent contexts

Motamid et al.: Experiment implications

- Use of lexical and spatial strategies
- Spatial strategies similar to natural signed languages
- Increase in convention
- Shift from z-axis to x-axis
- Evolution of distinct strategies



Questions:

I am still skeptical about the utility of iterated learning experiments in determining the origins and evolution of the language faculty: regardless of how "good" or "helpful" we can show this method to be, we will never be able to conclude from this that the method must have been the one by which language evolved. Could you explain your view on how this contributes to the study of language evolution- and what other research would need to be carried out to complement it?

- Iterated learning has happened (language, technology etc.)
- Again, more about evolution than origin
- Origin - requires more comparative work (cross-species, see Cat's work)

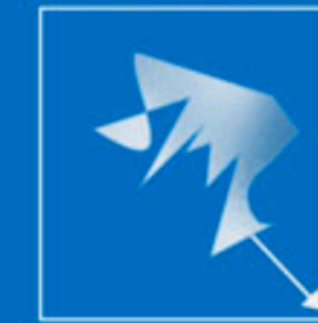
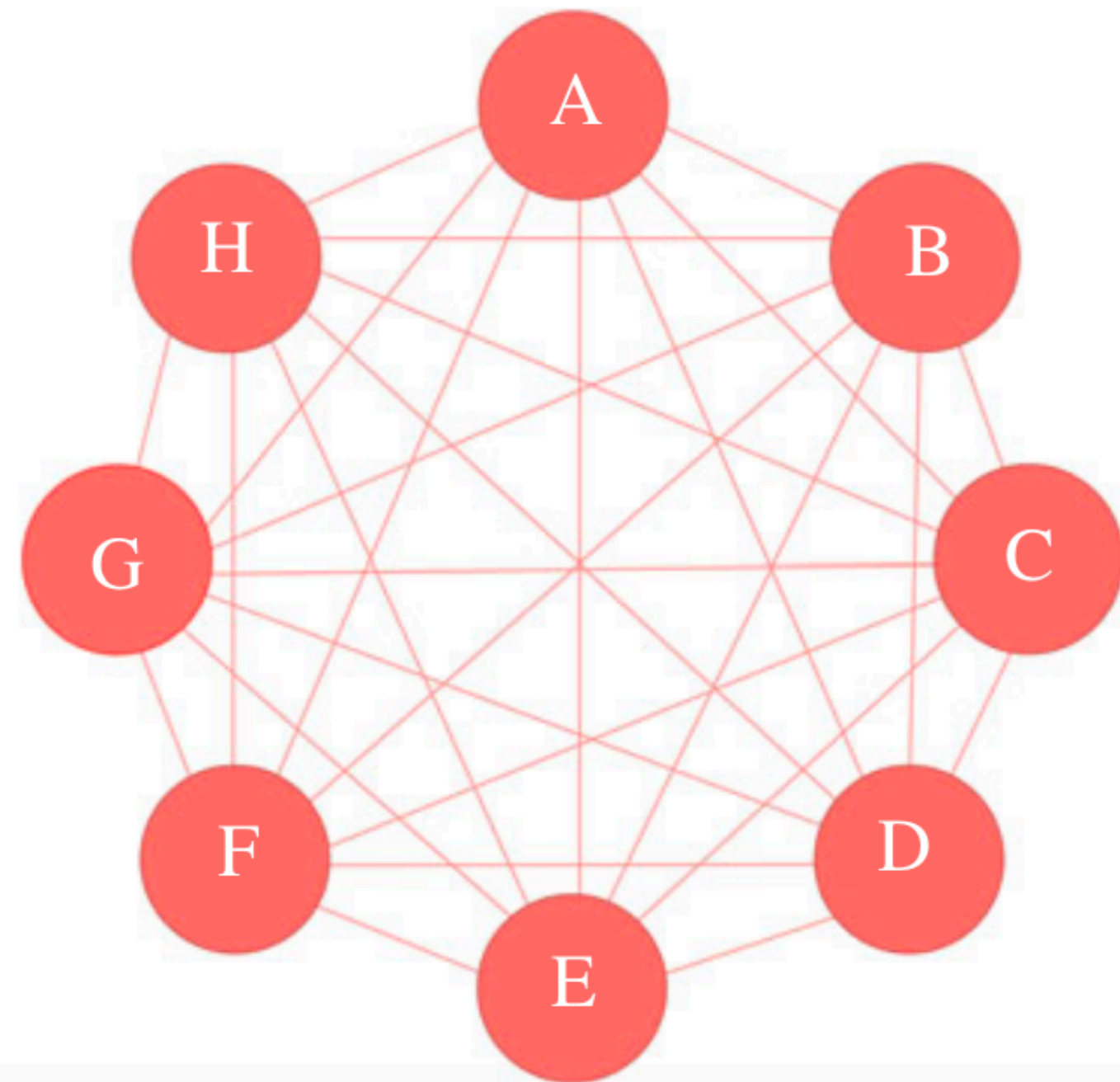
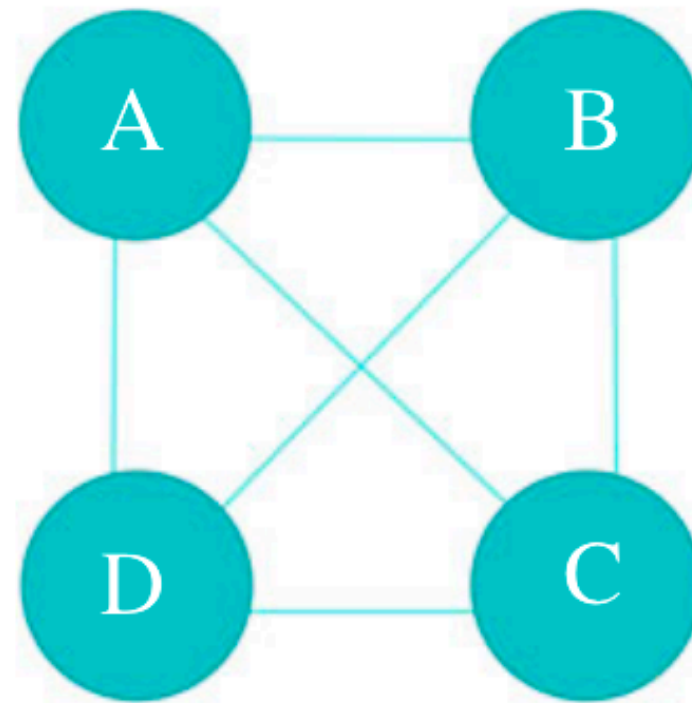
Communication experiment: Social structure

- Raviv et al. (2019)
- Emergence of systematicity based on community size
- Prediction: larger communities should create more systematic languages
- Why?
- Examines: changes in structure, communicative accuracy, structural agreement over time

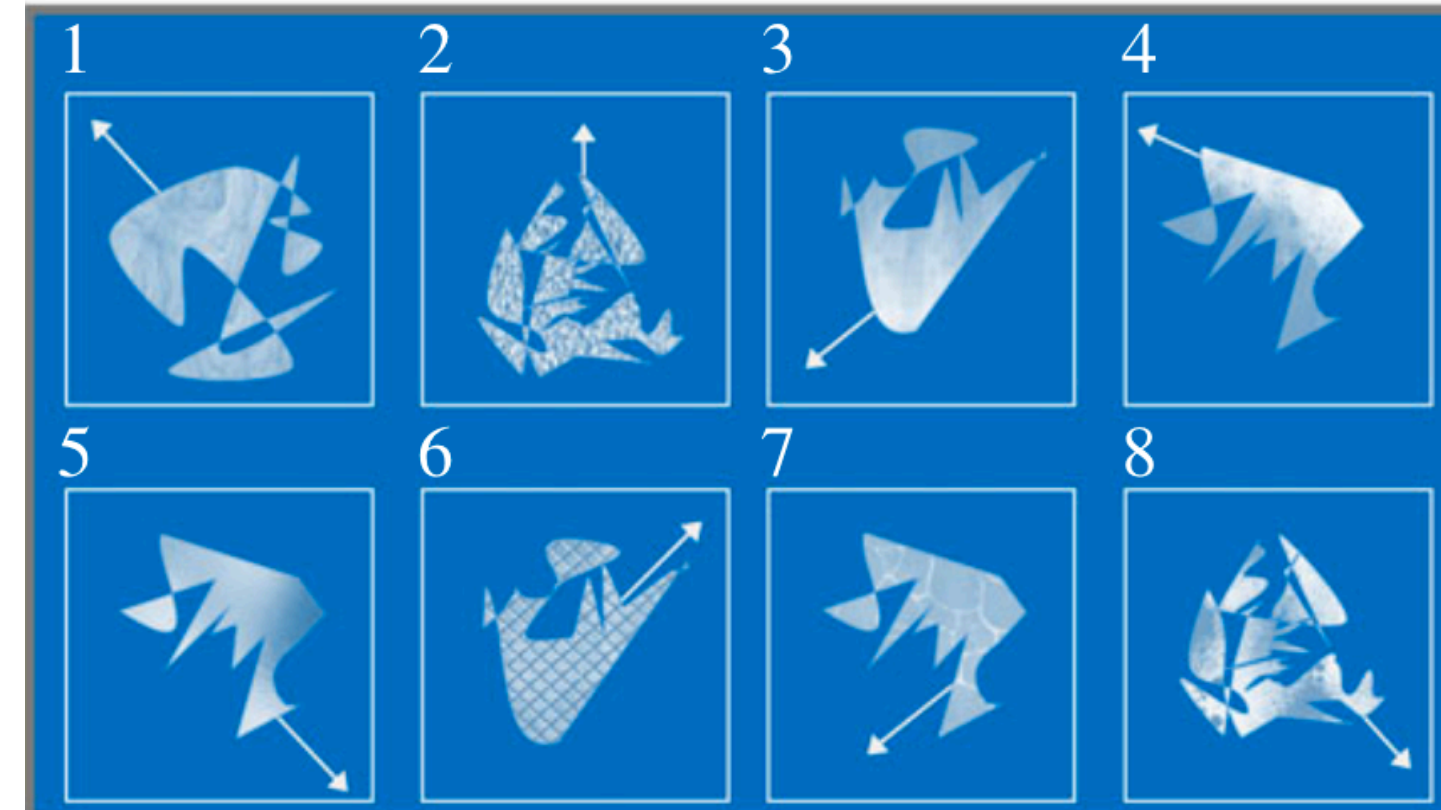
Vowels: a, e, i, o, u

Consonants: w, t, p, s, f, g, h, k, n, m

Other: -



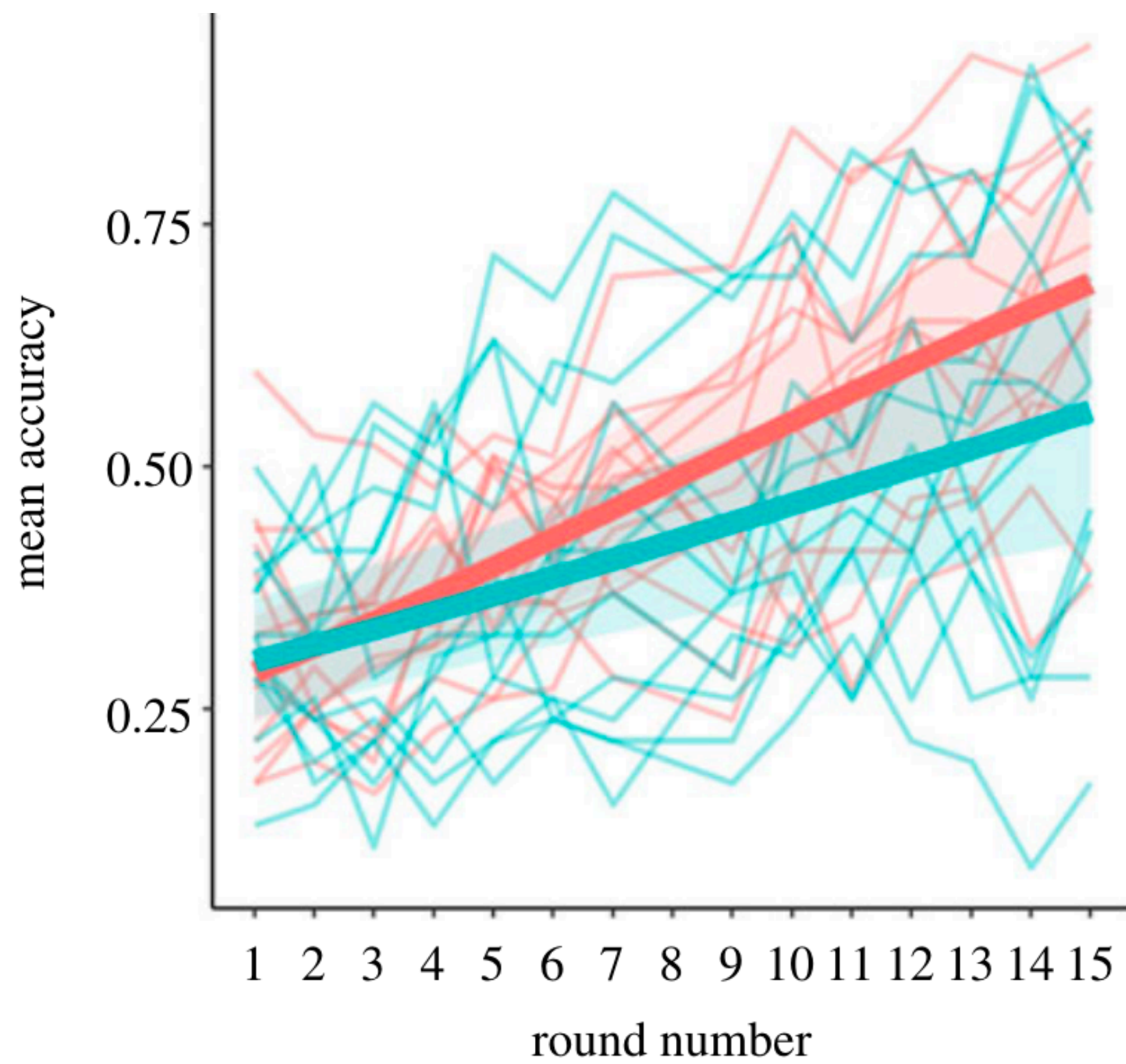
press enter to type a label



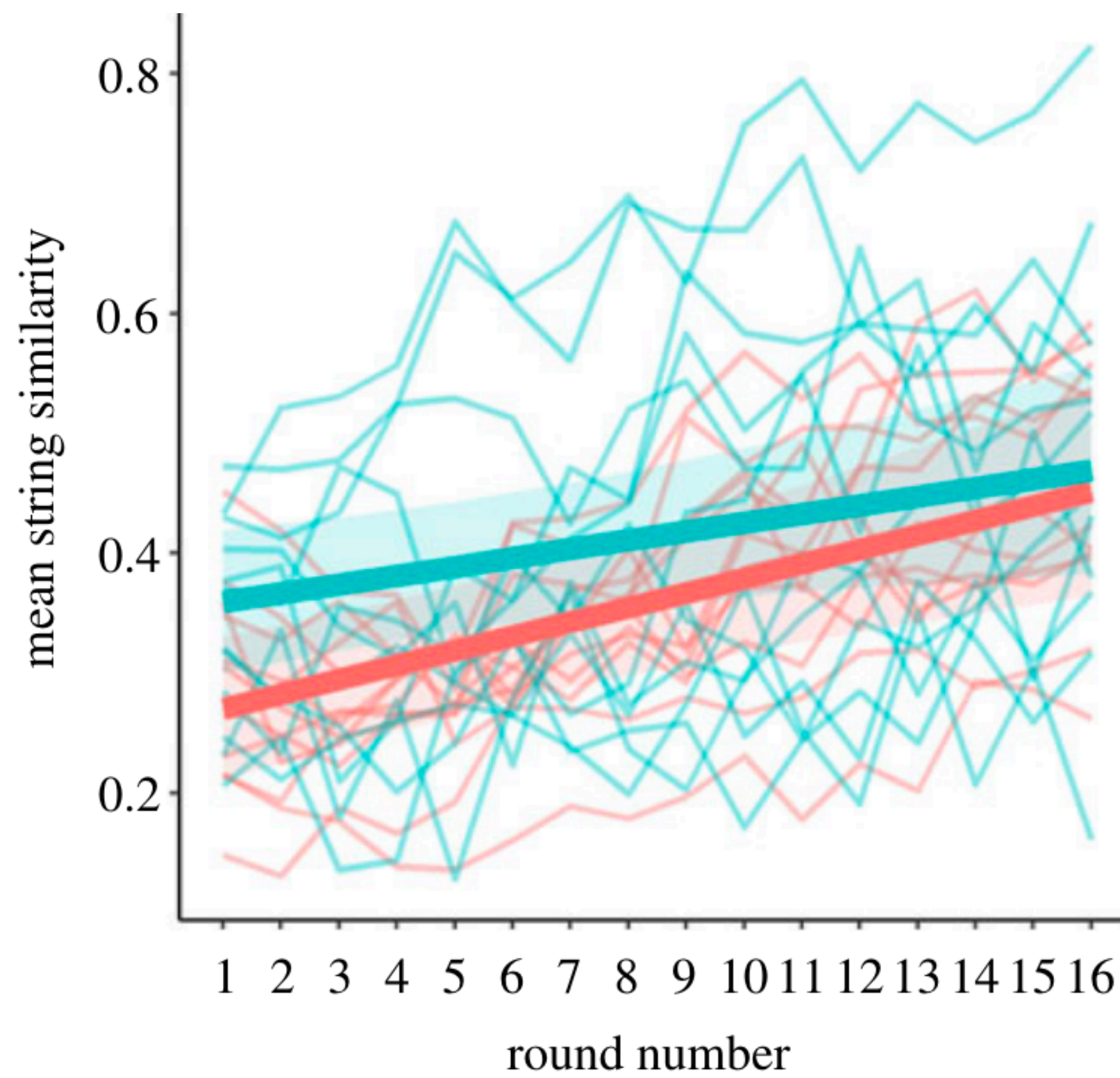
Measures

- **Communicative success:**
 - Correct target selection
- **Convergence:**
 - Similarity of labels
- **Stability:**
 - Similarities of labels for the same scene on two consecutive rounds
- **Linguistic structure:**
 - Similar meanings expressed using similar strings

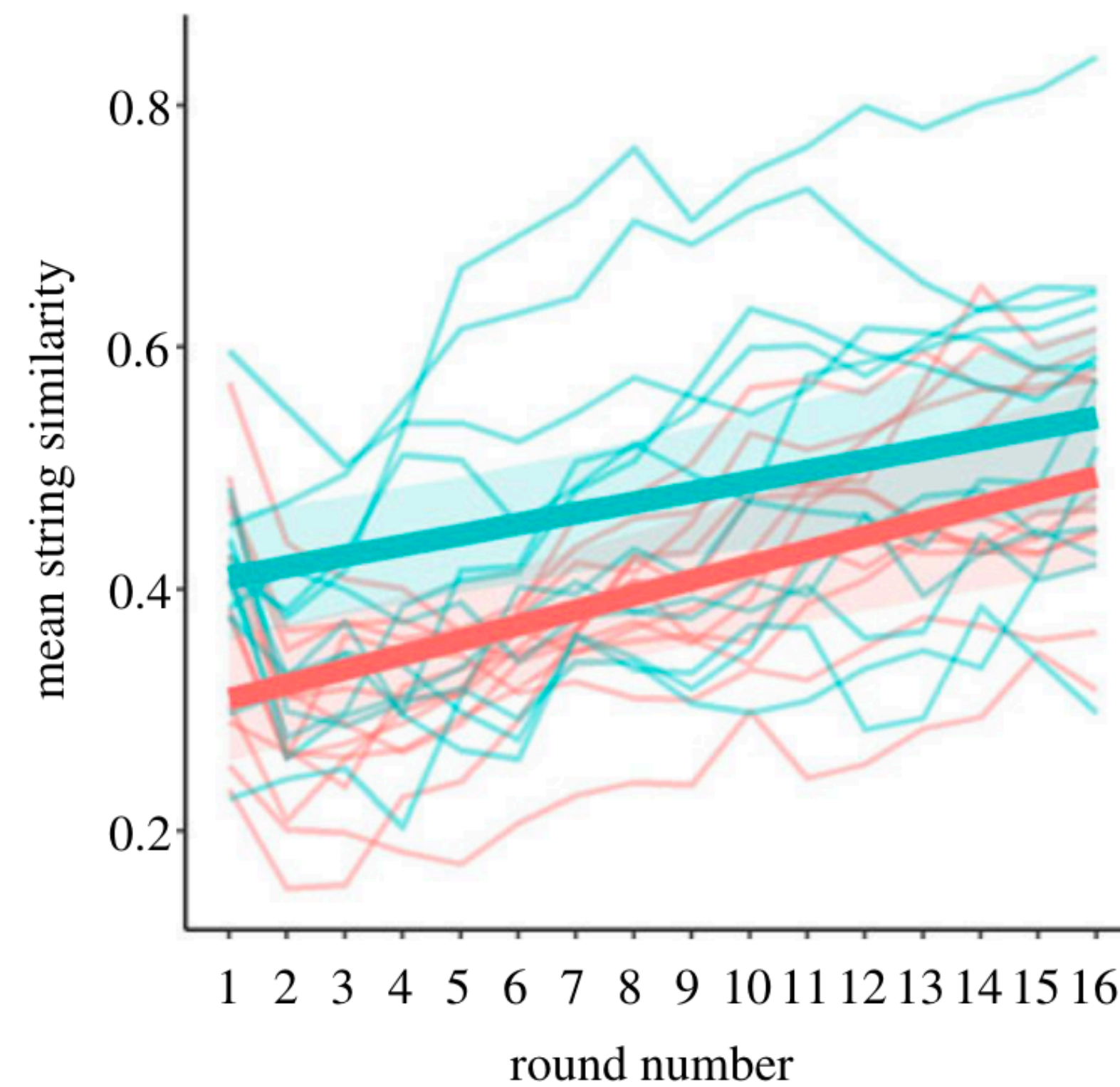
Communicative Success



Convergence



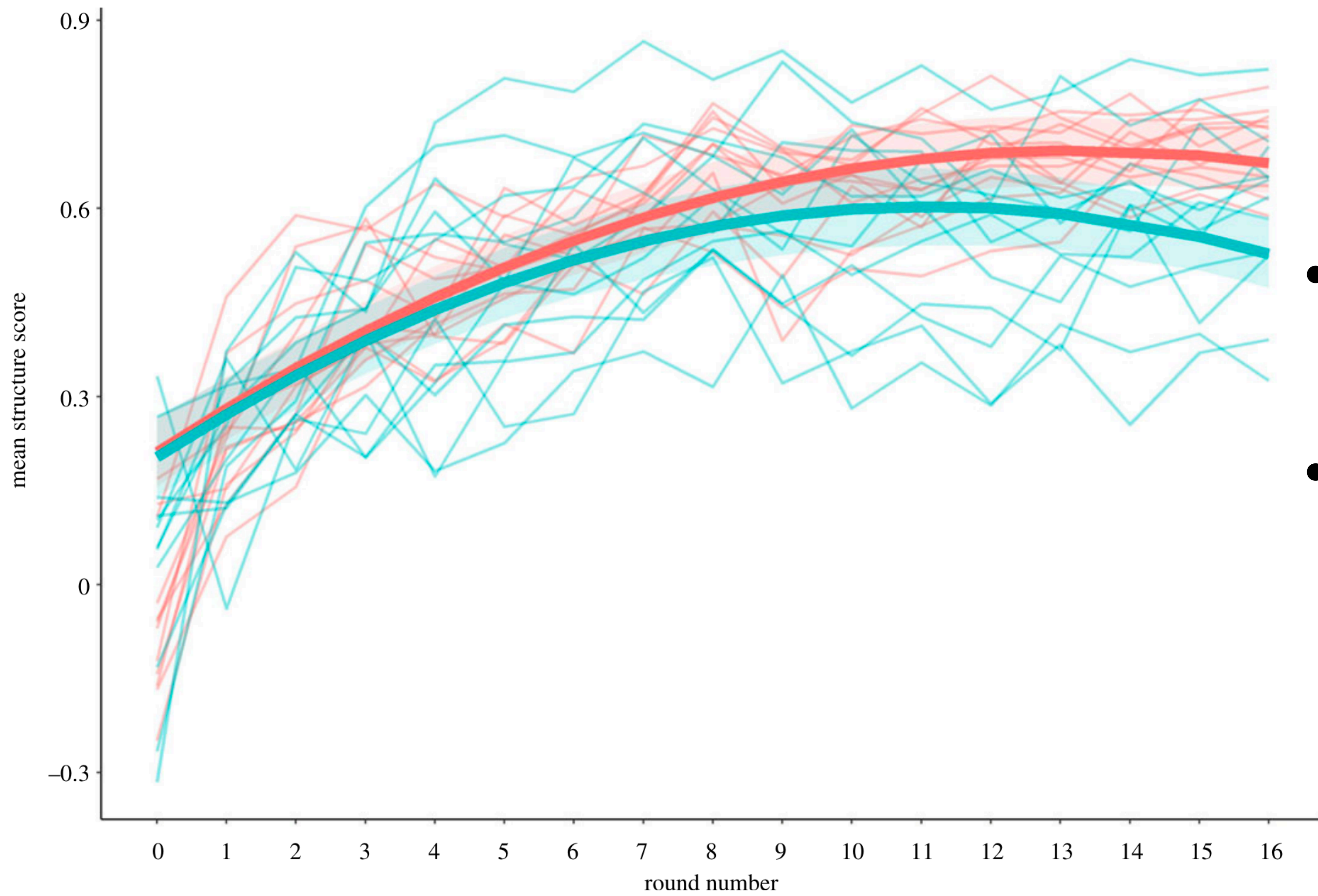
Stability



condition

- big groups
- small groups

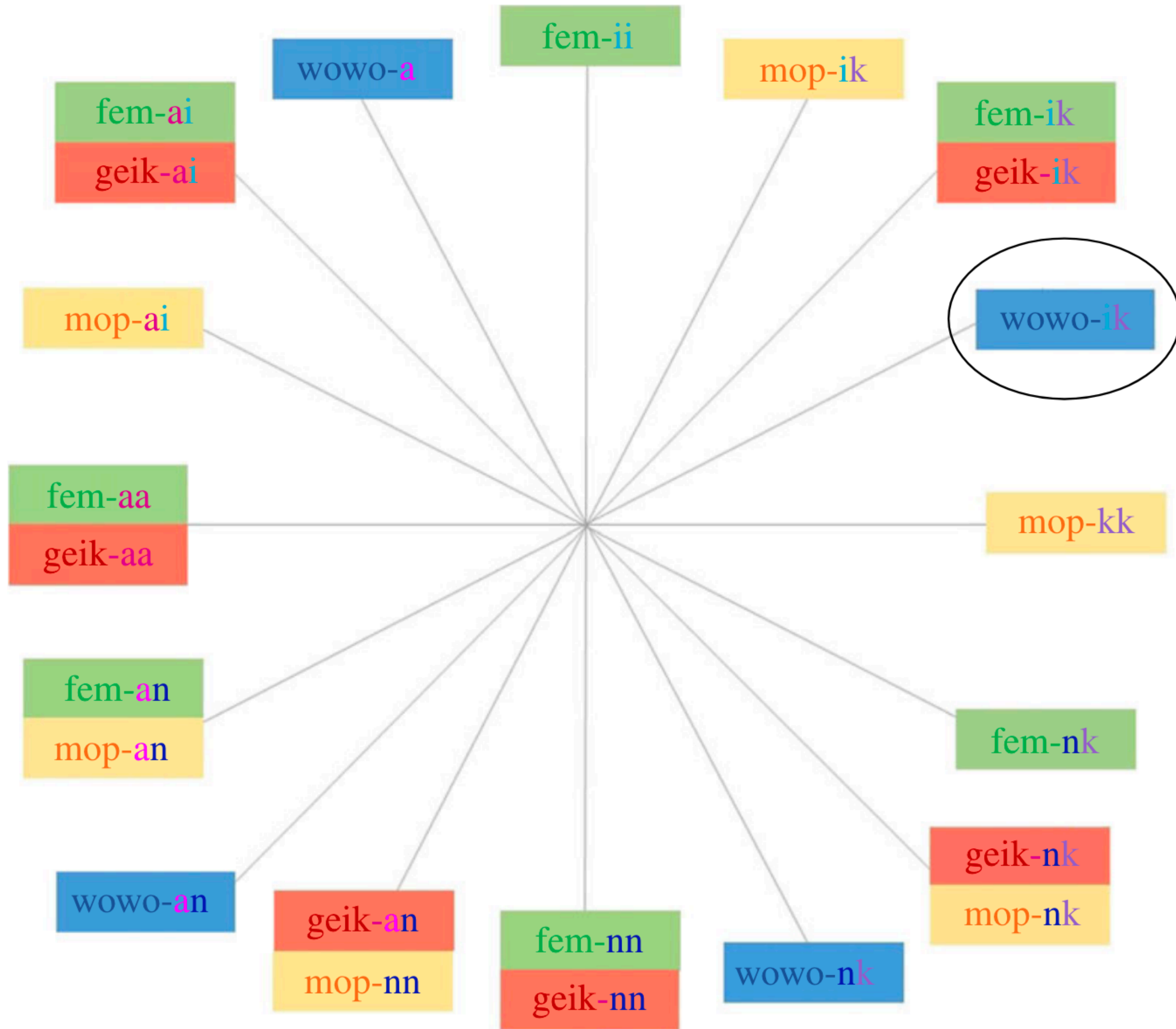
Linguistic structure



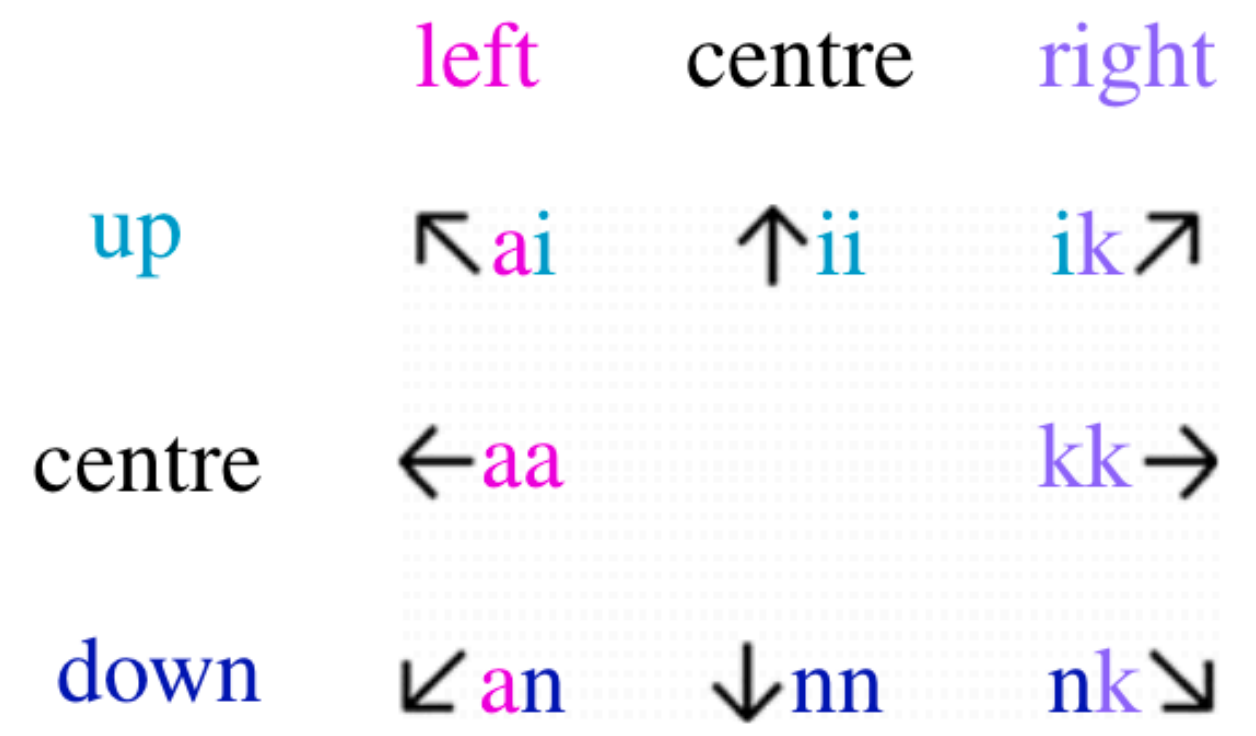
- Larger groups = faster structure
- Large groups = more structure

condition

- big groups
- small groups



- shape 1 = mop
- shape 2 = fem
- shape 3 = geik
- shape 4 = wowo



Raviv et al.: Experiment implications

- More uniform and systematic language in larger groups
- Parallel to findings comparing ABSL and ISL
- Two types of variability
 - One based on shared knowledge and close-knit community (early)
 - Geographical and social factors (late)

Reflections

- More accurate typology
- Varied example of contexts for studies of language change
- Modality specificity
- Long-term effects of repeated language learning and use
- Parallels with experiments in auditory and visual-manual modality

Implications for language evolution research

- Language emerges fast and in a variety of contexts
- Community is required for certain features to emerge
- Some shared features across all contexts (lexicon, compositionally, word order)
- Social context and community structure can influence process of conventionalisation

Bonus: gestural communication in apes

- Naturally-occurring gestural communication in great apes:
 - Come to the ELLE talk this week!
 - Hobaiter (2020) - Gestural Communication in Great Apes: Tracing the Origins of Language
- Gestural communication in language-trained apes:
 - Gardner & Gardner (1969) - Teaching sign language to a chimpanzee
 - Lloyd (2004) - Kanzi, evolution, and language

Thank you!

Reminders:

- Read Motamedi et al. (2019) before your tutorial this week
- Next week is the last week of lectures!

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Lecture references

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Lecture references

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