

# Points of Comparison

What Pointing Gestures tell Us About the Origins of Signs  
in San Juan Quiahije Chatino Sign Language



Kate Mesh

ISGS 8, Cape Town, South Africa

July 06, 2018

אוניברסיטת חיפה  
University of Haifa  
جامعة حيفا



- 1** Research motivation: Does gesture provide input to emerging sign languages?
- 2** Indicating gestures: A window into emerging sign language input
- 3** Two linked studies of indicating gestures in San Juan Quiahije (Oaxaca, Mexico)
  - 3.1 Co-speech indicating gestures
  - 3.2 Indicating in sign

**1**

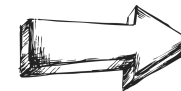
Research motivation: Does gesture provide input to emerging sign languages?

# Input in the context of signed language emergence

Goldin-Meadow & Feldman (1977)  
Morford (1996)  
Goldin-Meadow (2007)  
Morford & Kegl (2009)  
Goldin-Meadow (2013)  
Brentari & Golden-Meadow (2017)

## Input:

*Not* a conventional  
linguistic system



## Output:

A conventional  
ling. system with:  
syntax, morphology

Why do deaf signers of emerging languages develop **linguistic features** that are **absent from their input**?

# Input in the context of signed language emergence

Goldin-Meadow & Feldman (1977)  
Morford (1996)  
Goldin-Meadow (2007)  
Morford & Kegl (2009)  
Goldin-Meadow (2013)  
Brentari & Golden-Meadow (2017)

Washabaugh (1986)  
Volterra, et al (1994)  
Osugi & Webb (1999)  
Marsaja (2008)

## Input:

*Not* a conventional linguistic system



## Output:

A conventional ling. system with:  
syntax, morphology

***Formational features:*** do speakers and signers appear to use similar forms?

# Input in the context of signed language emergence

Washabaugh (1986)  
Volterra, Beronesi, and Massoni (1994)  
Osugi & Webb (1999)  
Marsaja (2008)  
Franklin et al (2011)

Washabaugh (1986)  
Volterra, et al (1994)  
Osugi & Webb (1999)  
Marsaja (2008)

Goldin-Meadow & Mylander (1990),  
Goldin-Meadow et al. (1995, 2007)  
Franklin, et al (2011)

## Input:

*Not a conventional  
linguistic system*



## Output:

A conventional  
ling. system with:  
syntax, morphology

In exactly what ways do formational features differ between input & output?

**2**

Indicating gestures: A window into  
emerging sign language input



# Indicating Gestures



- direct the addressee's attention to a delimited area of space
- by extending or tracing an articulator in the direction of a focused area
- are a bedrock of face-to-face communication in *hearing and deaf* people



- Multiple formational components that map to meaning
- Stable mapping across use contexts

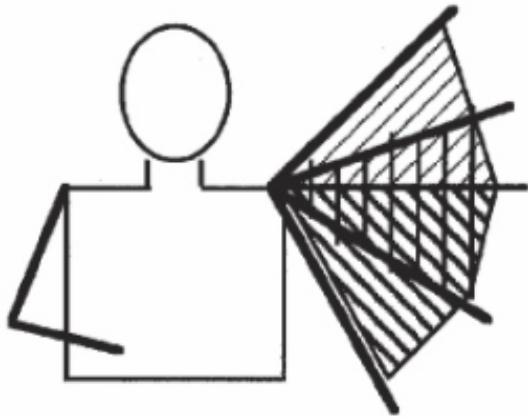
*Eco (1976)*

*Kendon (1980, 2003, 2004)*

*Wilkins (2003)*

*Haviland (2003)*

*Ola Orié (2009)*



 **nhakwe** (approx 90° - 140°)

 **yanhe** (approx 60° - 110°)

 **nhenhe** (approx 30° - 90°)

- Multiple formational components that map to meaning
- Stable mapping across use contexts

*Eco (1976)*

*Kendon (1980)*

*Wilkins (2003)*

*Haviland (2003)*

*Levinson (2003)*

*Ola Orié (2009)*

*Streeck (2009)*

*Le Guen (2011)*



de Vos, 2012,  
p. 364

*Distal  
locative point*



de Vos, 2014,  
p. 155

“Vertical indeterminacy”— does pointing high  
represent a far target or a high target?

de Vos, 2012, p. 377

IGs are composites of multiple  
formational components.

- components mapped to  
meanings stably across use  
contexts

- gesturers and signers

van der Kooij, 2002  
de Vos (2012, 2014)

### **3** Two linked studies of indicating gestures in San Juan Quiahije (Oaxaca, Mexico)

#### **3.1 Co-speech indicating gestures**

#### 3.2 Indicating in sign

# The San Juan Quiahije Municipality



# The San Juan Quiahije Municipality

Pop. 3,628 (INEGI 2012)

Spoken languages:

SJQ Chatino, Spanish

Deaf individuals: 11

6 adults (2 female), 5 children (all female)

Sign languages emerging in 6 families



# Indicating Gestures of Quiahije



Points



Go gestures



## **3.1** Co-speech indicating gestures

1. Formational features of indicating gestures systematically covary with the **distance** of the indicated target



a. **Elbow Height:** increased distance -> increased height

b. **Arm Extension:** increased distance -> greater extension

c. **Handshape:** increased distance - > increased use of open hand

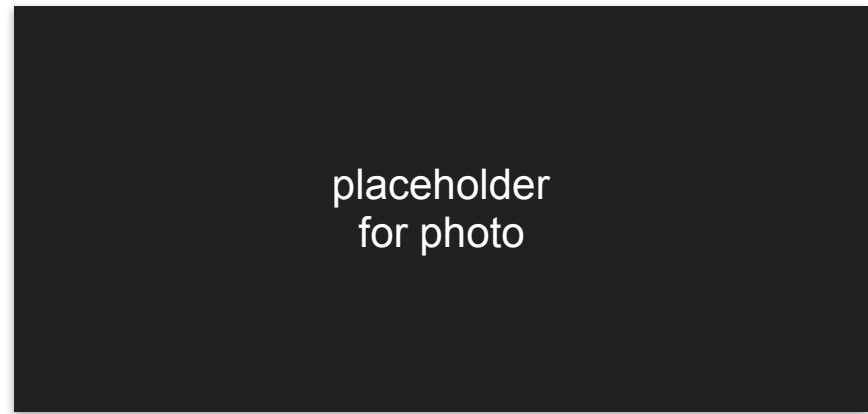


2. This systematicity holds regardless of the gesture type (pointing vs. go gestures)

# Dataset

Filmed local environment interviews (Kita 2001)

- 29 hearing participants
- Six hr., 30 min. of footage
- **873 IGs**



# Kinesic features investigated:

Elbow Height



placeholder  
for photo



placeholder  
for photo

Handshape



placeholder  
for photo

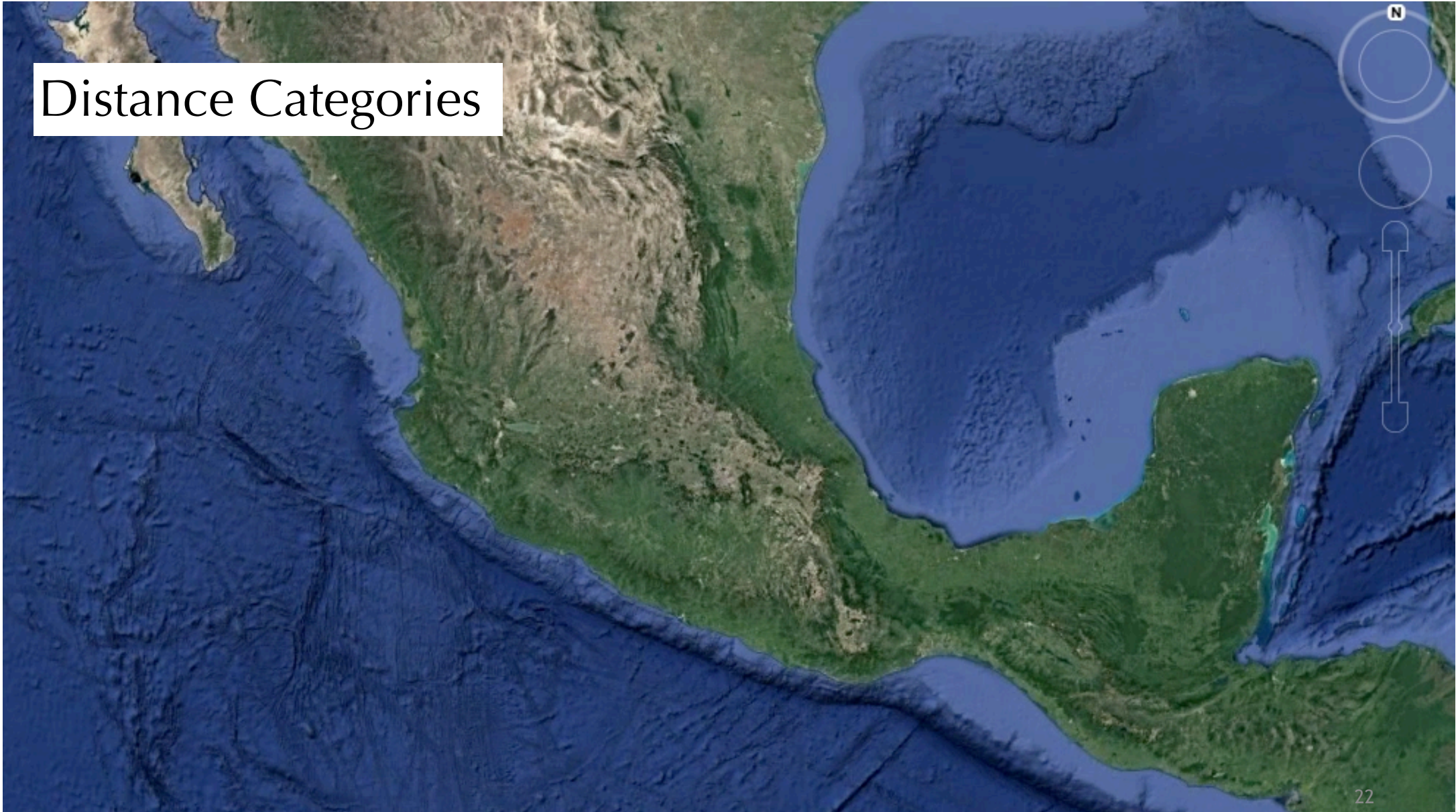
Arm Extension

Indicating  
Target  
Features  
Coded:

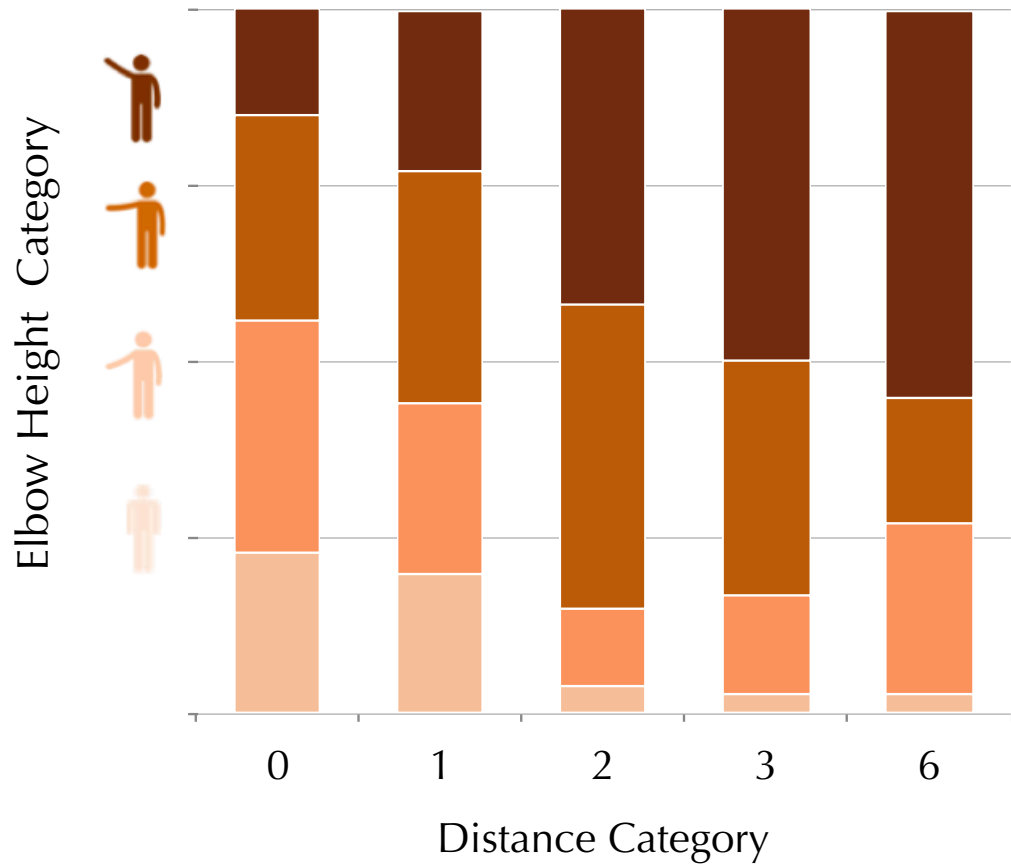
**Distance**  
(from  
gesture to  
gesturer)



# Distance Categories



# Results: **Elbow Height**, all indicating gestures



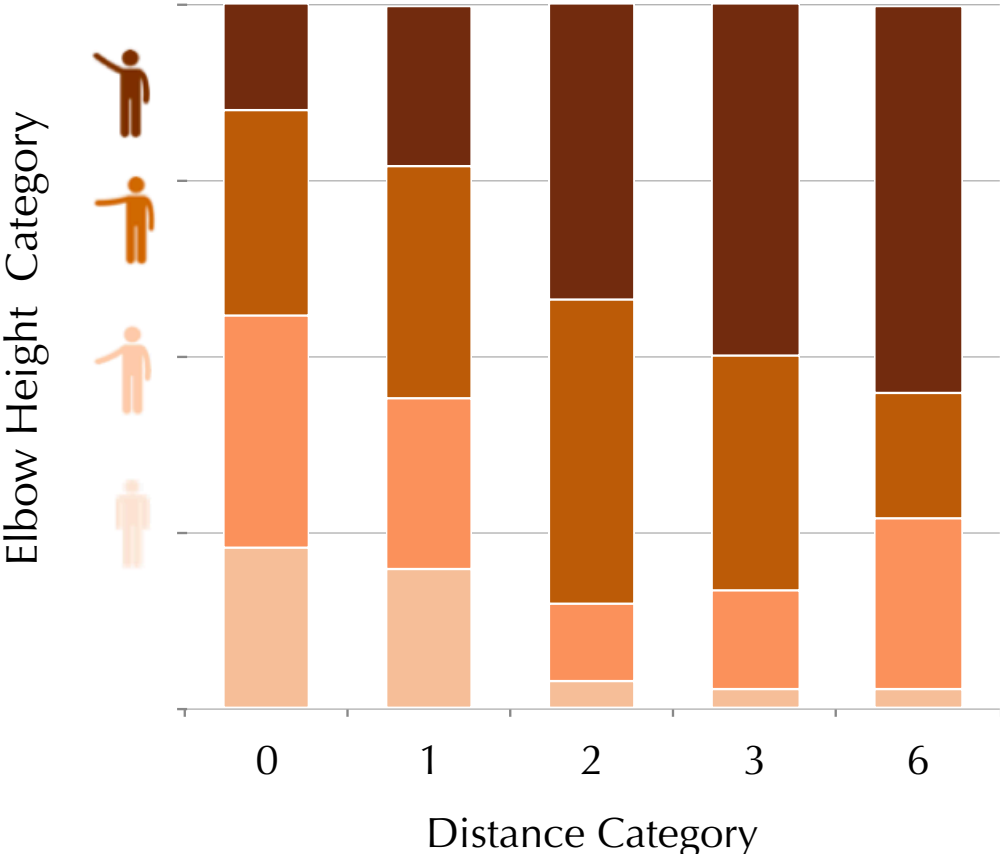
Fixed Effects	Estimate	SE	Pr(>  t )
(Intercept)	1.04	0.20	< 0.001
Distance	0.18	0.02	< 0.001
Altitude	0.02	0.02	0.13

Random Effects	Variance
Person (Intercept)	0.36
Residual	0.76

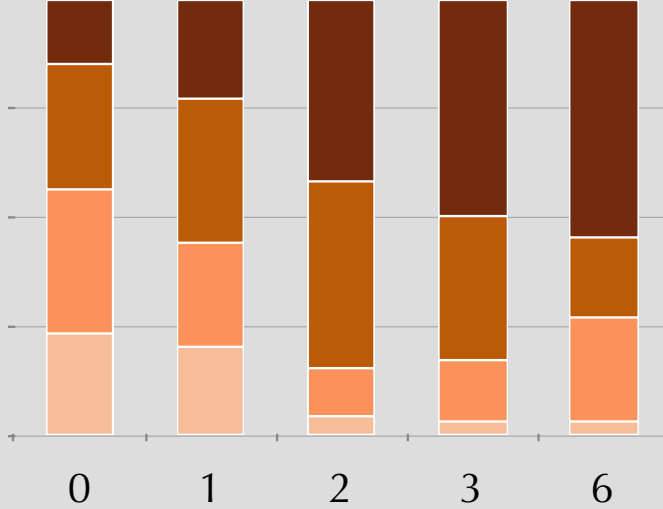
Mixed effects linear regression analysis

- Significant effect of **distance** alone

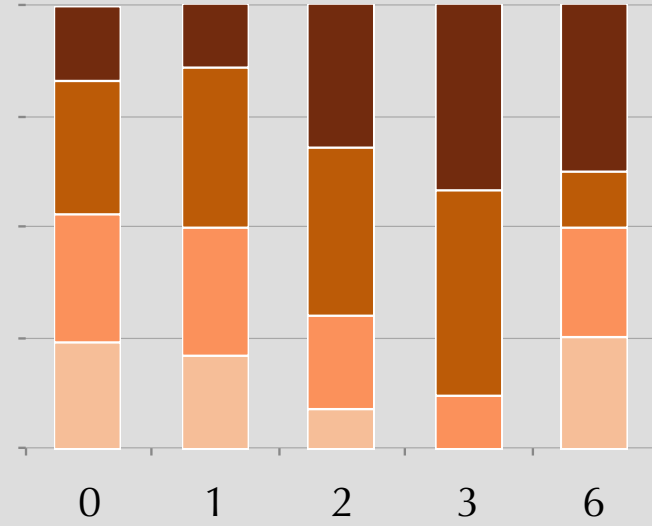
# Results: **Elbow Height**, by gesture type



Points



Go gestures





## Results: **Elbow Height**, by gesture type

Fixed Effects	Estimate	SE	Pr(>   t  )
(Intercept)	1.23	0.13	<0.001
Distance	0.17	0.02	< 0.001
Gesture Type:			
Go gest.	(ref)		
Points	0.12	0.07	0.3

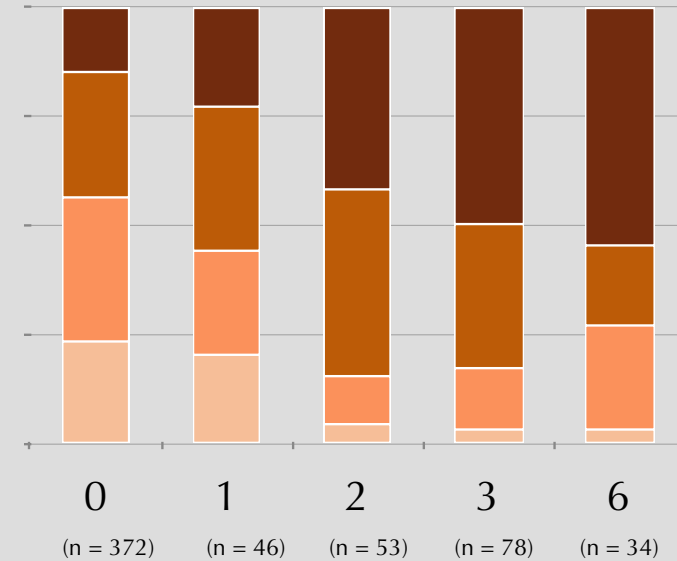
Random Effects	Variance
Person (Intercept)	0.35
Residual	0.76

Mixed effects linear regression analysis

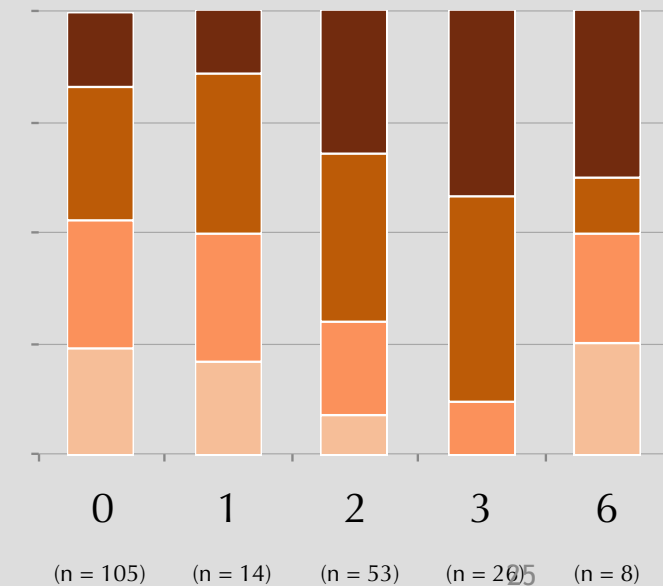
- No significant effect of gesture type



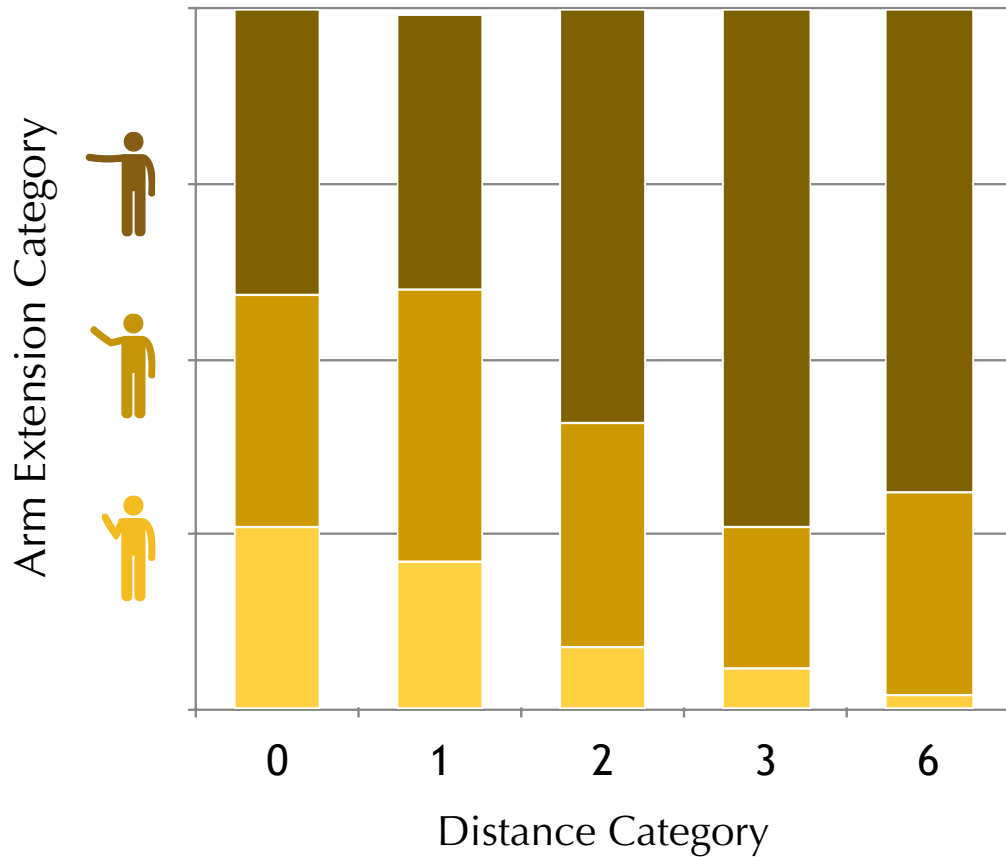
Points



Go gestures



# Results: Arm Extension, all indicating gestures



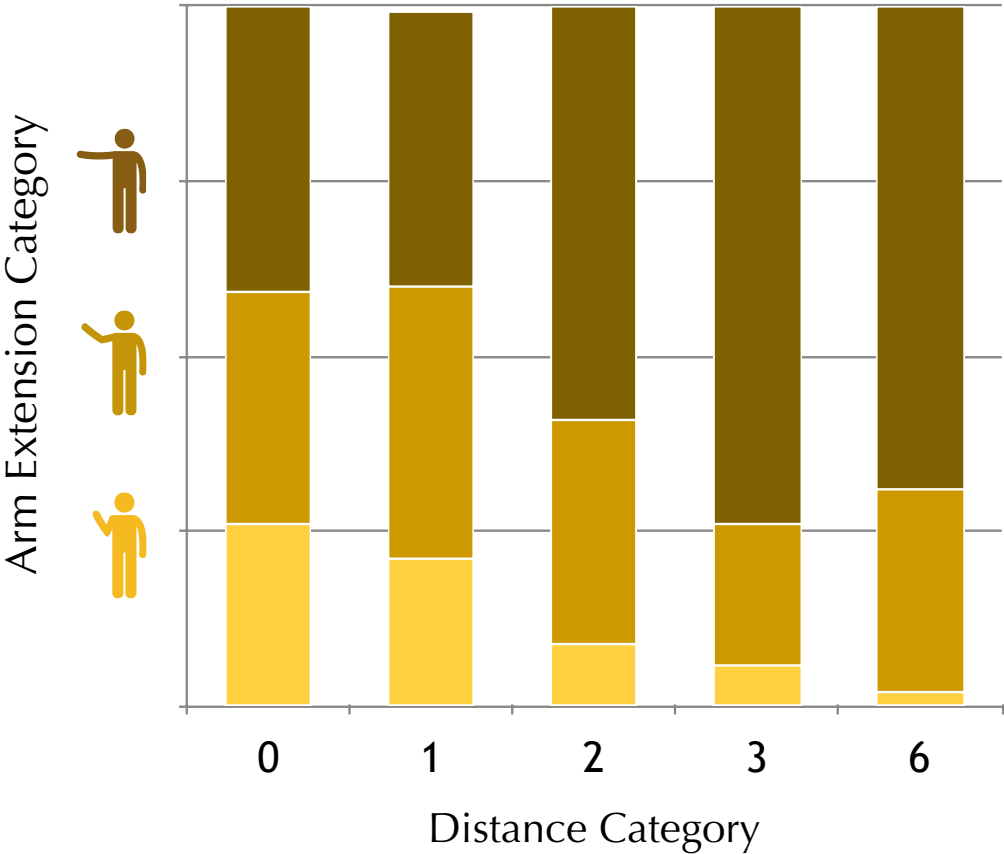
Fixed Effects	Estimate	SE	Pr(>  t )
(Intercept)	1.10	0.15	< 0.001
Distance	0.11	0.01	< 0.001
Altitude	-0.01	0.01	0.6

Random Effects	Variance
Person (Intercept)	0.20
Residual	0.41

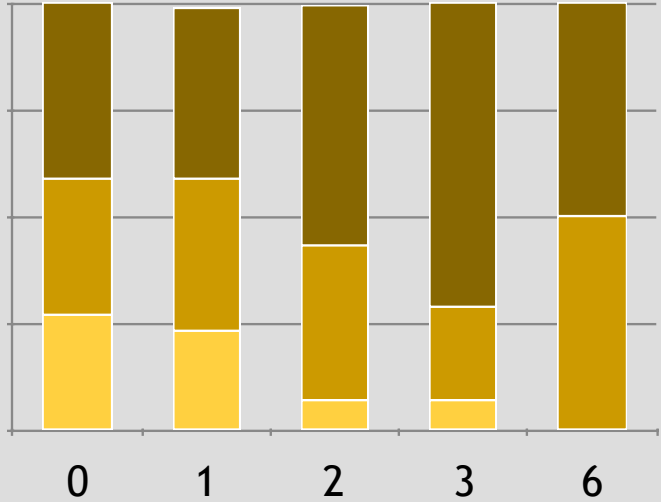
Mixed effects linear regression analysis

- Main effect of **distance** alone

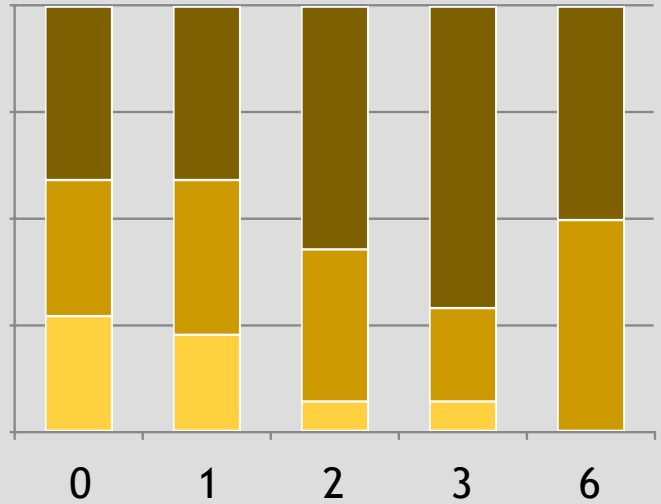
# Results: Arm Extension, by gesture type



Points



Go gestures



# Results: Arm Extension, by gesture type

Fixed Effects	Estimate	SE	Pr(>  t )
(Intercept)	0.00	0.10	< 0.001
Distance	0.06	0.05	< 0.001
Gesture Type:			
Go gest.	(ref)		
Points	0.06	0.03	0.02

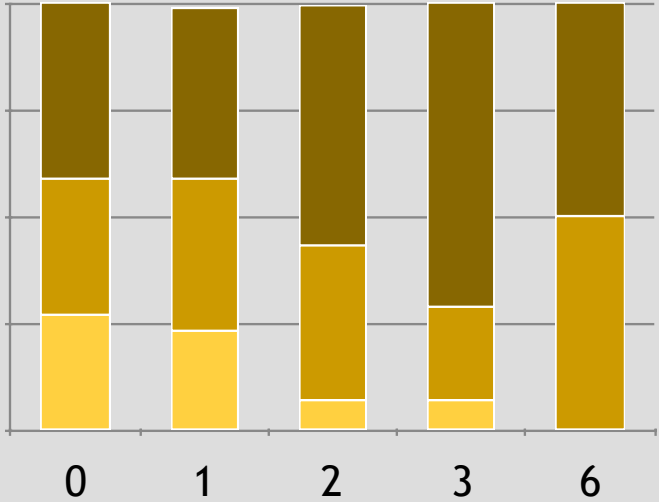
Random Effects	Variance
Person (Intercept)	2.64

Mixed effects linear regression analysis

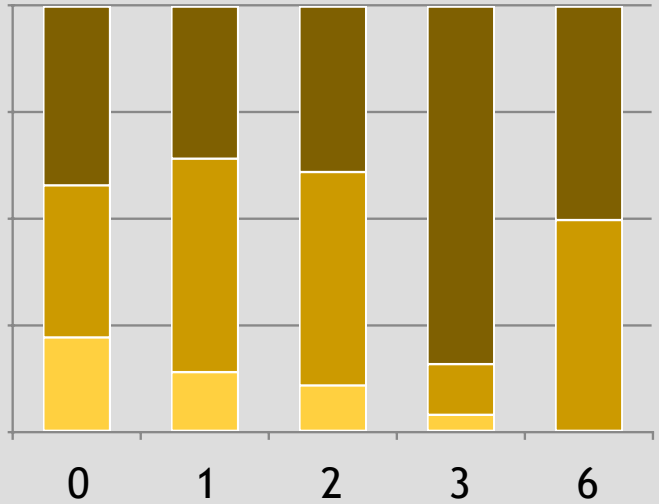
- No significant effect of gesture type on elbow height



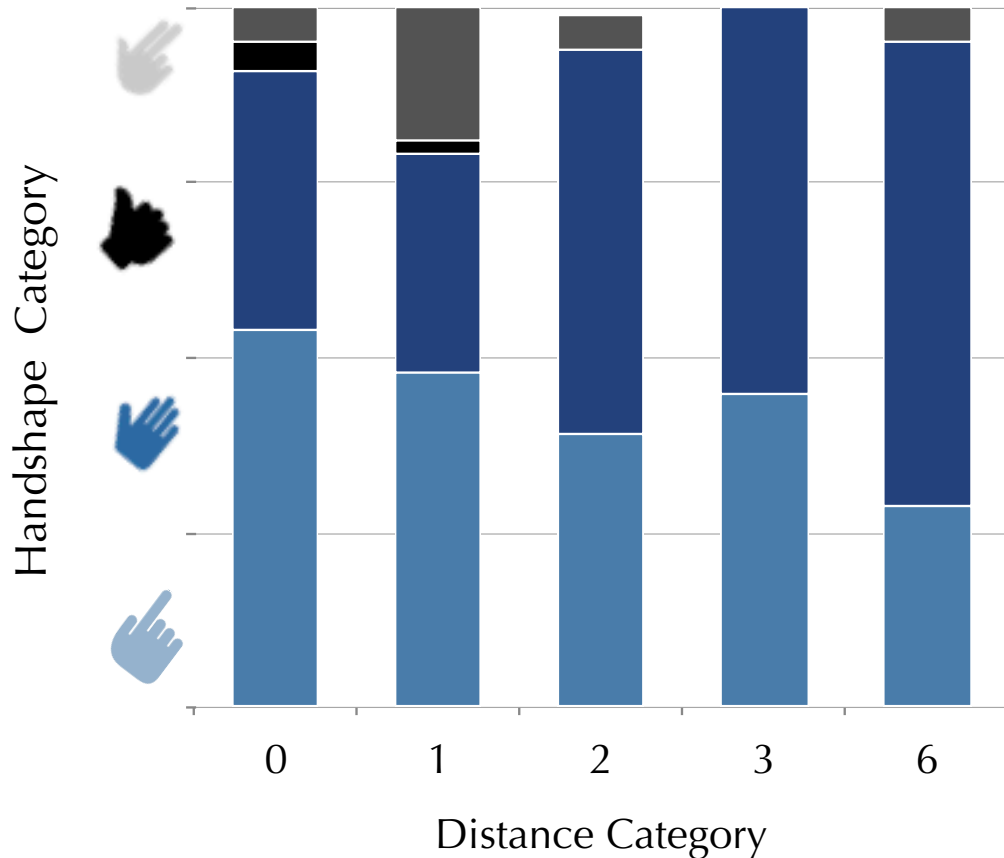
Points



Go gestures



# Results: **Handshape**, all indicating gestures



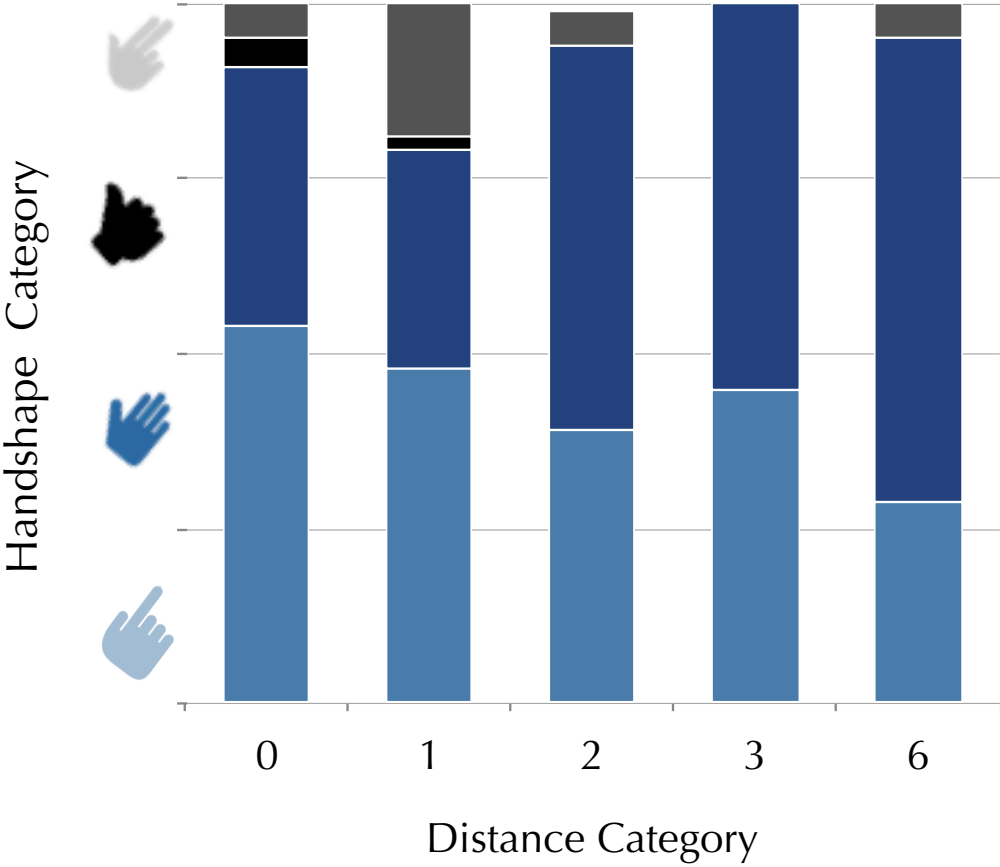
Fixed Effects	Estimate	SE	Pr(>   t  )
(Intercept)	0.67	0.39	0.51
Distance	1.38	0.08	< 0.001
Altitude	0.97	0.45	0.56

Random Effects	Variance
Person (Intercept)	2.52

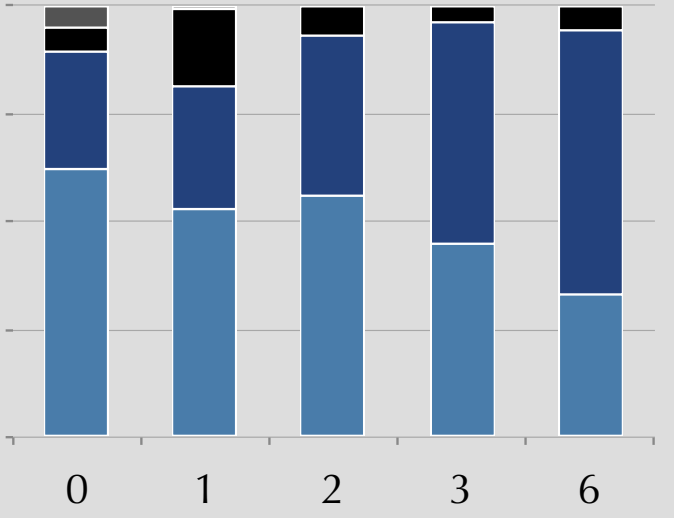
Mixed effects logistic regression analysis

- Main effect of **distance** alone

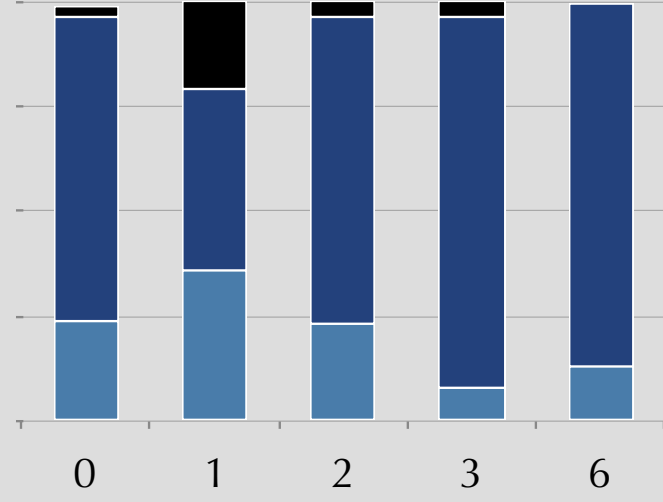
# Results: Handshape, by gesture type



Points



Go gestures



# Results: **Handshape**, by gesture type

Fixed Effects	Estimate	SE	Pr(>  t )
(Intercept)	2.44	0.93	<0.05
Distance	1.38	0.08	< 0.001
Gesture Type:			
Go gest.	(ref)		
Points	0.12	0.03	<0.001

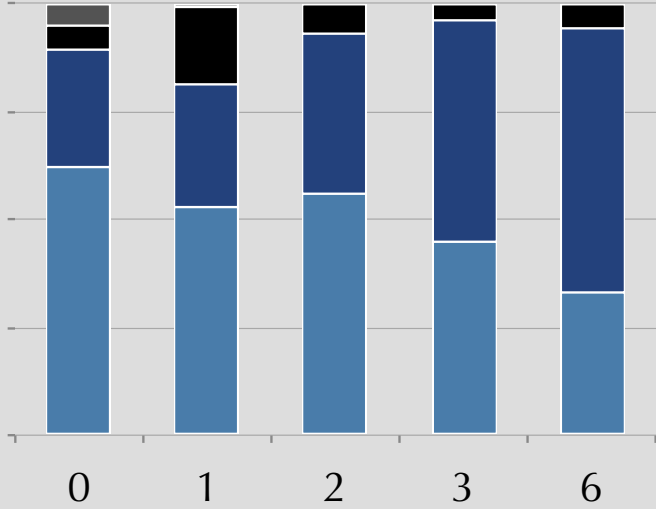
Random Effects	Variance
Person (Intercept)	2.64

Mixed effects linear regression analysis

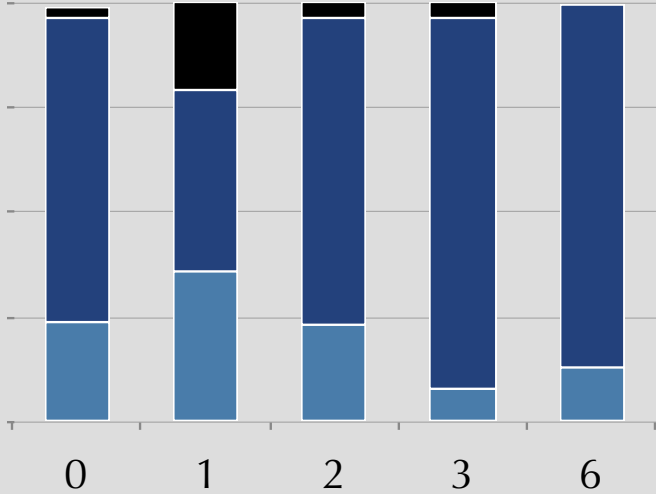
- Main effect of **gesture type**



Points



Go gestures



# Summary: **Points**





## Summary: Go Gestures





1. Formational features of indicating gestures systematically covary with the **distance** of the indicated target



a. **Elbow Height:** increased distance -> increased height

b. **Arm Extension:** increased distance -> greater extension

c. **Handshape:** increased distance - > increased use of open hand



This systematicity holds regardless of the gesture type (pointing vs. go gestures)

### **3** Two linked studies of indicating gestures in San Juan Quiahije (Oaxaca, Mexico)

3.1 Co-speech indicating gestures

**3.2 Indicating in sign**

1. Signers of SJQCSL, like speaker-gesturers in Quiahije, modulate features of indicating gestures to convey the distance of the indicated target.

a. **Elbow Height:** increased distance -> increased height

b. **Arm Extension:** increased distance -> greater extension

c. **Handshape:** increased distance - > increased use of open hand

# Dataset

Filmed local environment interviews (Kita 2001)

- 29 hearing participants
- Six hr., 30 min. of footage
- 873 IGs
- 2 deaf participants
- 31.5 min. of footage
- **222 Indicating signs**





***Koyu***

*51 years old*

*1 deaf older  
sibling*

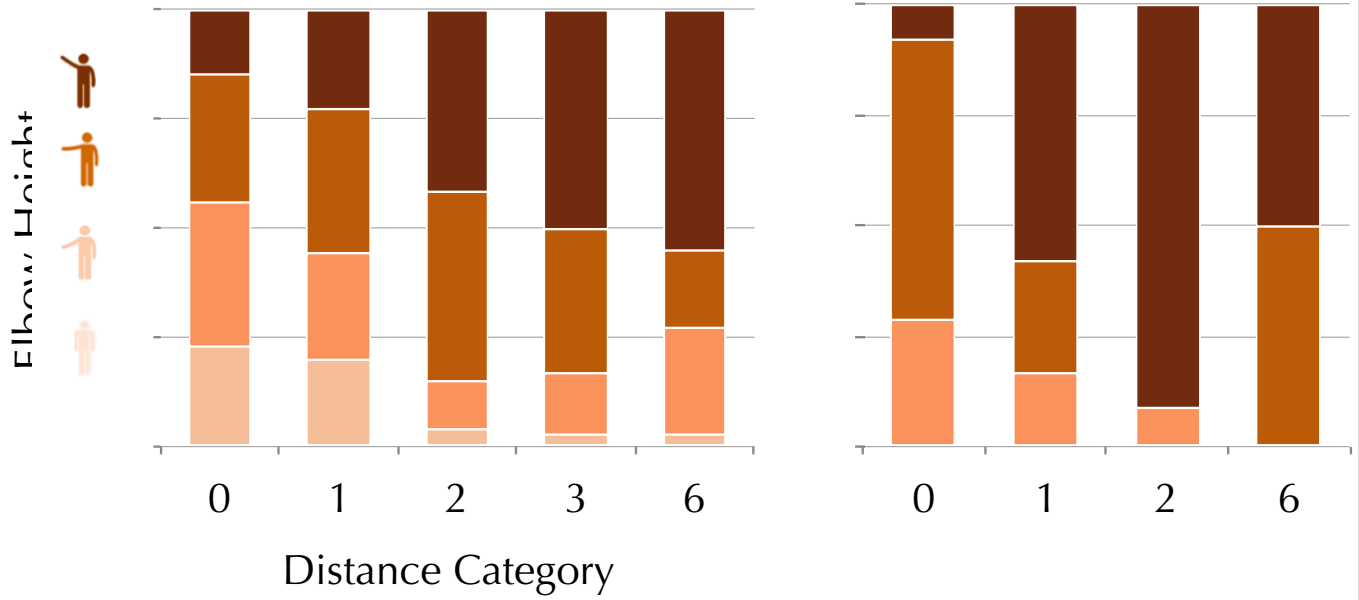


***Sendo***

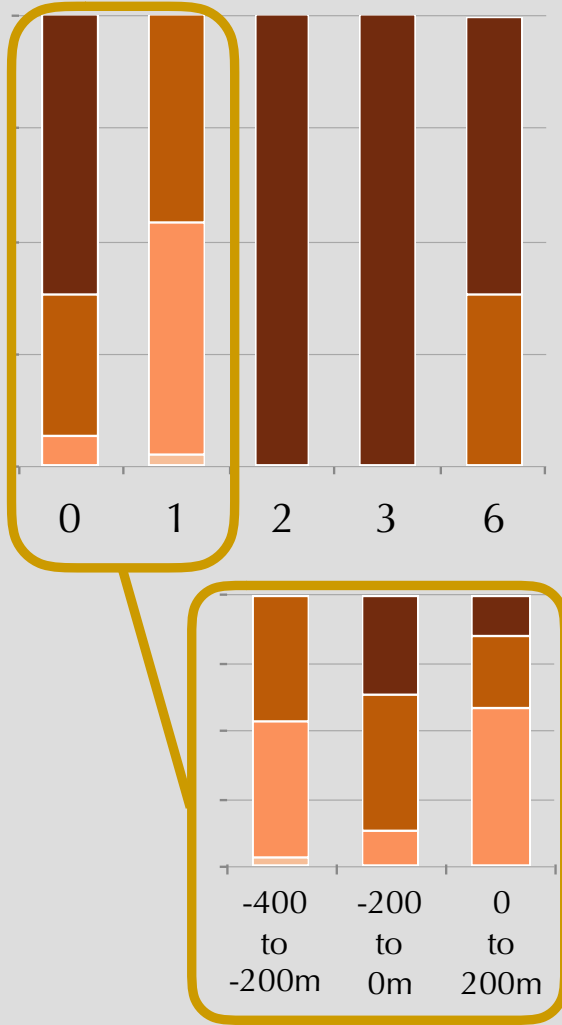
*30 years old*

*No deaf  
siblings*

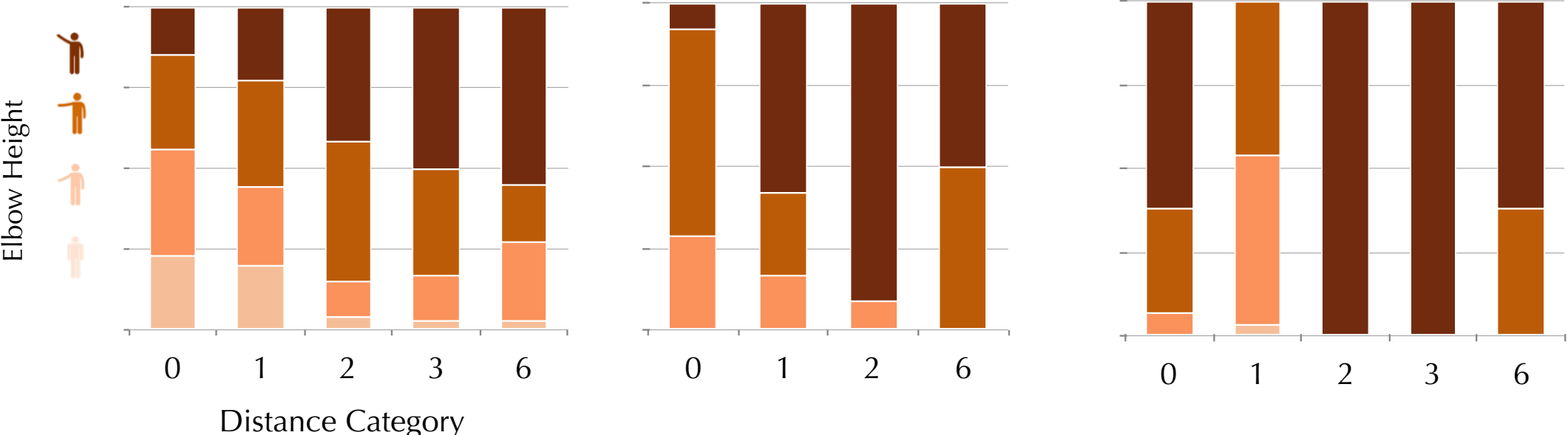
# Results: **Elbow Height**, all indicating signs



Sendo



# Results: **Elbow Height**, all indicating signs



Mixed effects linear regression analysis

- Main effect of **distance** alone
- No gesture type effect

Fixed Effects	Estimate	SE	Pr(>   t   )
(Intercept)	1.11	0.75	0.14
Distance	0.15	0.05	< 0.01
Altitude	0.09	0.07	0.17

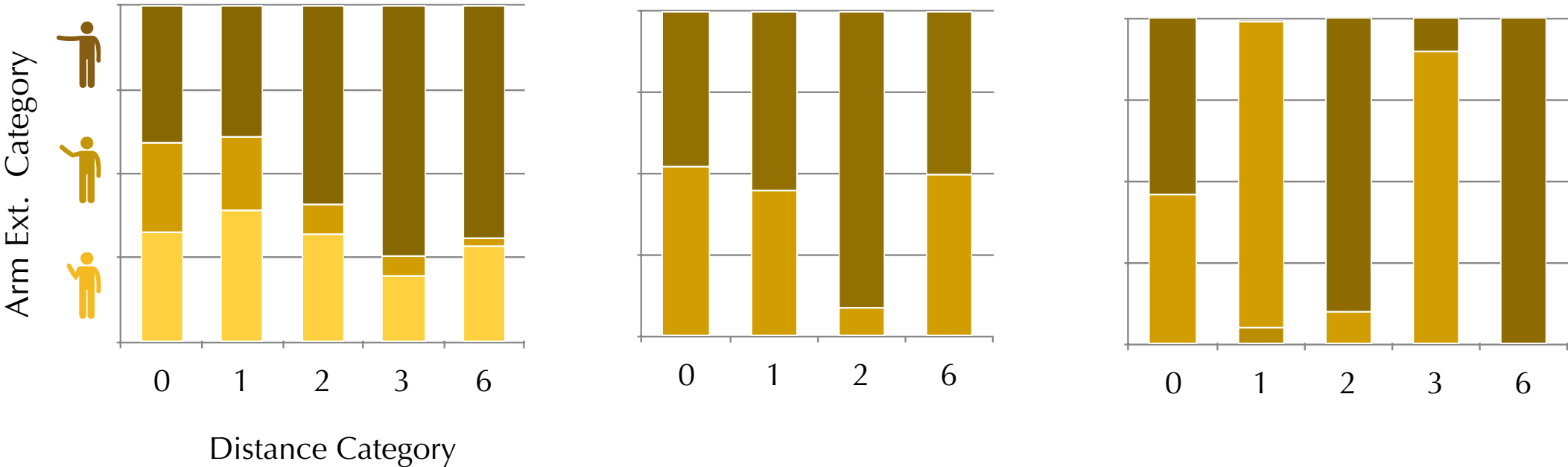
Sendo

Fixed Effects	Estimate	SE	Pr(>   t   )
(Intercept)	1.87	0.09	< 0.001
Distance	0.18	0.03	< 0.001
Altitude	-0.01	0.02	0.59

Koyu



# Results: Arm Extension, all indicating signs

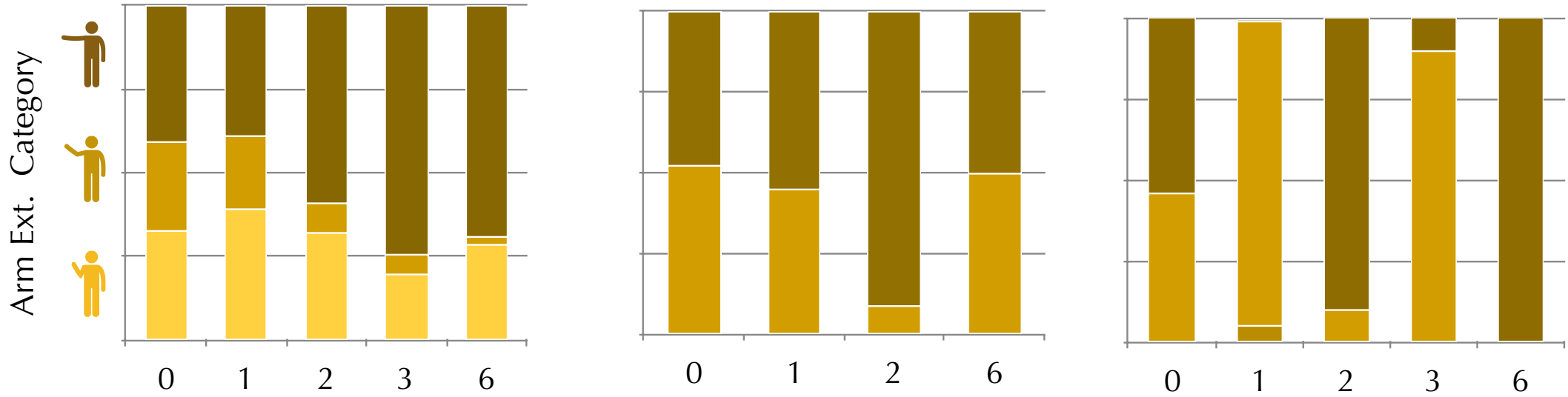


Sendo



Koyu

# Results: Arm Extension, all indicating signs



Mixed effects linear regression analysis

- No effect of distance or altitude
- No gesture type effect

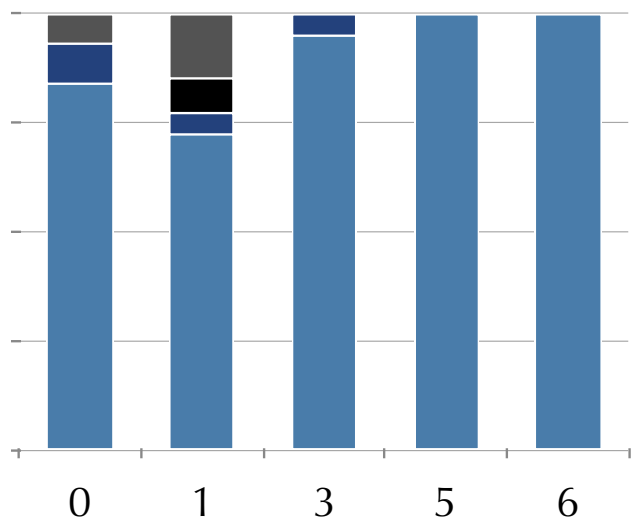
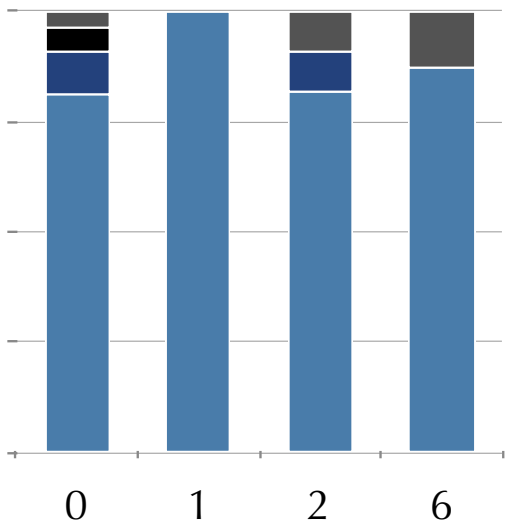
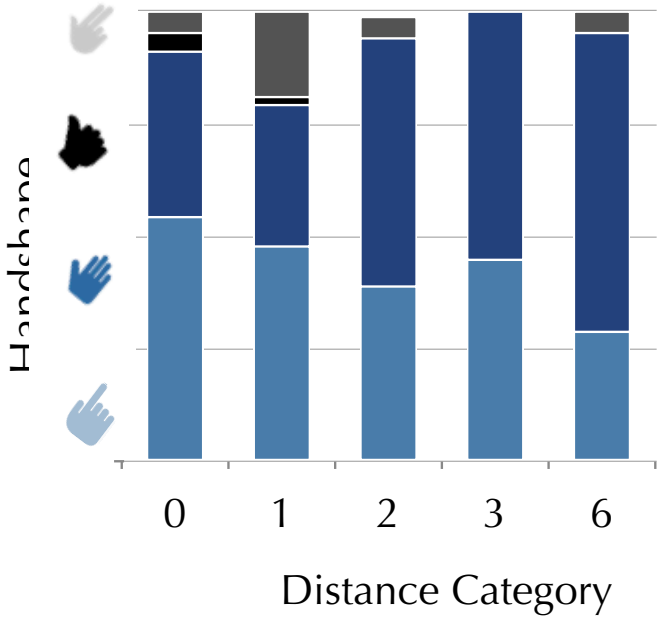
Fixed Effects	Estimate	SE	Pr(>  t )
(Intercept)	1.79	0.57	0.003
Distance	0.02	0.03	0.48
Altitude	-0.02	0.05	0.47

Sendo

Fixed Effects	Estimate	SE	Pr(>  t )
(Intercept)	1.09	0.14	< 0.001
Distance	0.01	0.02	0.68
Altitude	0.02	0.01	0.19

Koyu

# Results: Handshape, all indicating signs



No regression analysis



Sendo



Koyu

## Summary: Signer vs. Gesturer comparison

### Elbow Height



- Community conventions for modulating the height of indicating gestures are shared across speakers and signers
- Transmission of the height modulation practice takes place for *hearing and deaf* community members

## Summary: Signer vs. Gesturer comparison

**Elbow Height**



- **Community conventions** for modulating the height of indicating gestures are shared across speakers and signers
- Transmission of the height modulation practice takes place for *hearing and deaf* community members

## Summary: Signer vs. Gesturer comparison

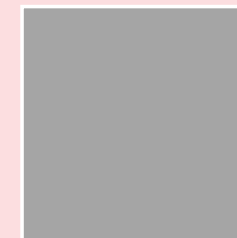
**Elbow Height**



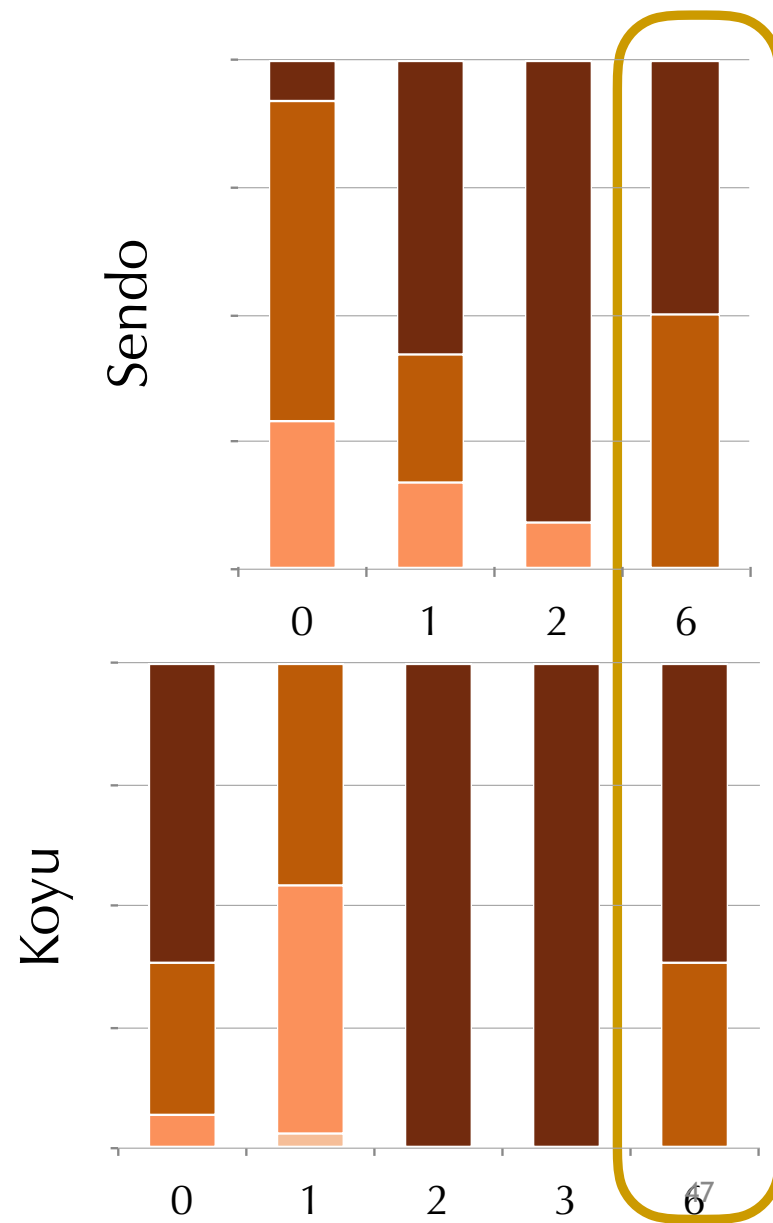
**Arm Extension**



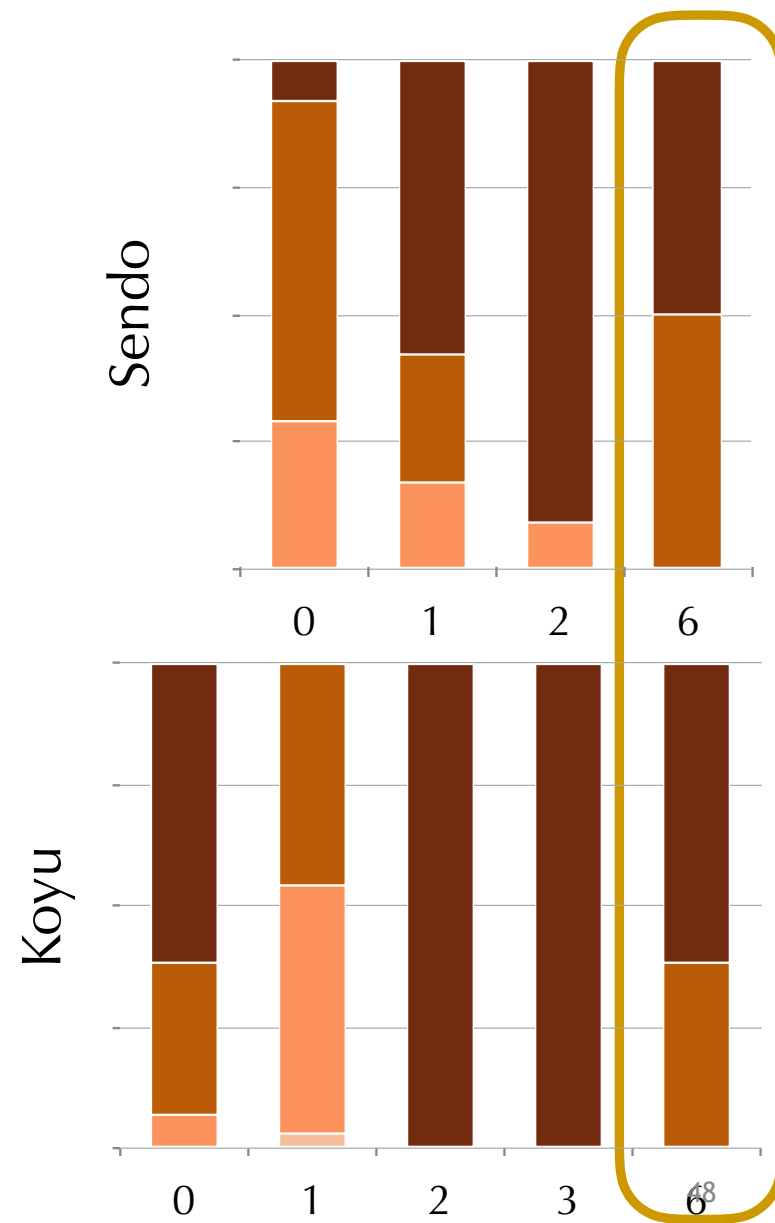
**Handshape**



# Signers' Unique Indicating Features: **Pointing**



# Signers' Unique Indicating Features: **Pointing**





## Signers' Unique Indicating Features: **Go** gesture



# Summary and Future Directions

In San Juan Quiahije,

- Some practices for meaningful modulation of pointing are shared between gesturers and signers
- Where signers diverge from the larger community pattern, they replace features rather than simply omitting them

Creators of signed languages do not merely “borrow” gestural practices:

- They are recipients of a process of cultural transmission, like their hearing counterparts
- They modify the practices that they receive, in ways that are evident when signers and gesturers are systematically compared



Special thanks to Lynn Hou, Hilaria Cruz, David Quinto-Pozos, Richard Meier and Jürgen Streeck

Support with statistical models:

Sally Ragsdale  
Cindy Blanco  
Michael Mahometa

Support with GIS software:

Jessica Trelogan  
Morgan Erhardt  
Karl Pichotta

Images from Gan Khoon Lay  
via the Noun Project

Image editing by Shai Davidi



# References

- Eco, U. (1976). *A theory of semiotics*. Bloomington, IN: Indiana University Press.
- Emmorey, K. (1999). Do signers gesture? In L. S. Messing & R. Campbell (Eds.), *Gesture, speech, and sign*. New York, NY: Oxford University Press.
- Gonseth, C., Vilain, A., & Vilain, C. (2013). An experimental study of speech/gesture interactions and distance encoding. *Speech communication*, 55(4), 553-571.
- Haviland, J. B. (2003). How to point in Zinacantan. In S. Kita (Ed.), *Pointing: where language, culture and cognition meet* (pp. 139–170). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Kendon, A. (1980). A description of a deaf-mute sign language from the Enga Province of Papua New Guinea with some comparative discussion: Parts I–II. *Semiotica*, 32(1/2).
- Kendon, A. (2004). *Gesture: Visible action as utterance*. Cambridge, England: Cambridge University Press.
- Le Guen, O. (2011). Modes of pointing to existing spaces and the use of frames of reference. *Gesture*, 11(3), 271–307.
- Levinson, S. C. (2003). *Space in language and cognition: Explorations in cognitive diversity*. Cambridge, England: Cambridge University Press.
- McNeill, D. (1992). *Hand and mind: What gestures reveal about thought*. Chicago, IL: University of Chicago Press.
- Orie, O. O. (2009). Pointing the Yoruba way. *Gesture*, 9(2), 237-261.
- Singleton, J. L., Goldin-Meadow, S., & McNeill, D. (2013). The cataclysmic break between gesticulation and sign: Evidence against a unified continuum of gestural communication. In K. Emmorey & J. Reilly (Eds.), *Language, gesture and space* (pp. 287–311). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- de Vos, C. (2013). *Sign-Spatiality in Kata Kolok: How a village sign language of Bali inscribes its signing space*. (Dissertation.) Utrecht, the Netherlands: LOT.
- de Vos, C. (2014). The Kata Kolok Pointing System: Morphemization and Syntactic Integration. *Topics in Cognitive Science*, 7(1), 150–168.
- Wilkins, D. (2003). Why pointing with the index finger is not a universal (in sociocultural and semiotic terms). In S. Kita (Ed.), *Pointing: where language, culture and cognition meet* (pp. 171–215). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.