Learning sign language

Ling 140
Spring 2018

Language and Cognition

STANFORD UNIVERSITY

Language Learning Lab

CENTER FOR INFANT STUDIES

discussion

- discuss any personal experience or exposure to sign language
- generate and write down 1-2 questions that you have about sign language (e.g., how it works, history, culture, acquisition, …)

Historical status of signed languages

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“A language of gesture, devoid of propositions, conjunctions, and abstract words”

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“A language of gesture, devoid of propositions, conjunctions, and abstract words”

“It is generally agreed that sign language is bound to the concrete and is rather limited with respect to abstraction, humor, and subtleties such as figures of speech which enrich expression.”

Hearing and Deafness
(Davis & Silverman, 1970)

Historical status of signed languages

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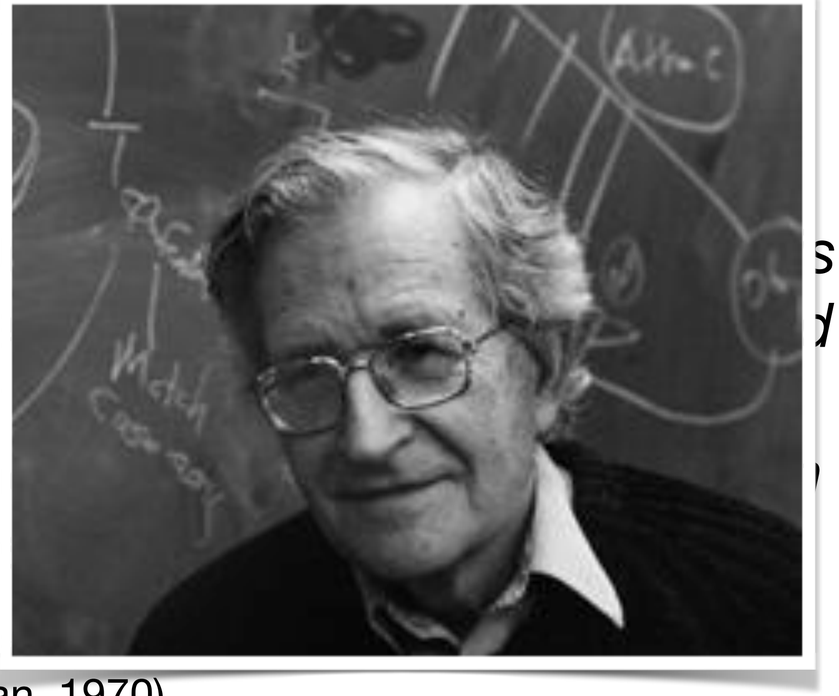

1960s

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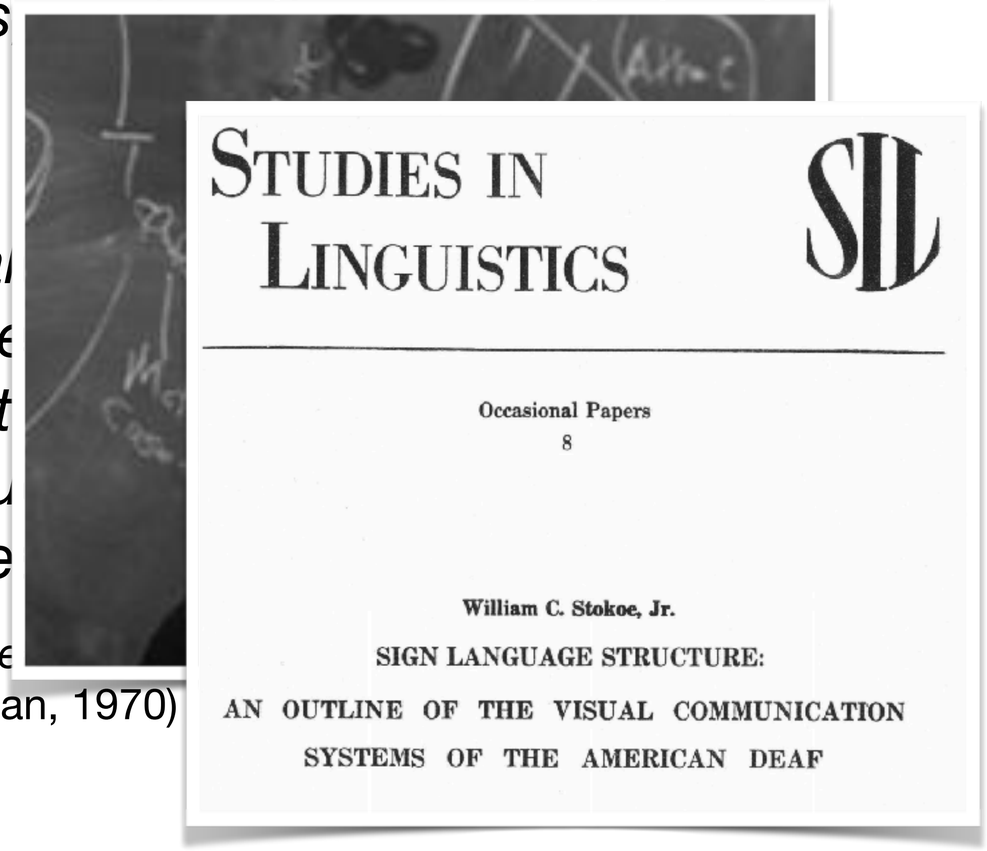

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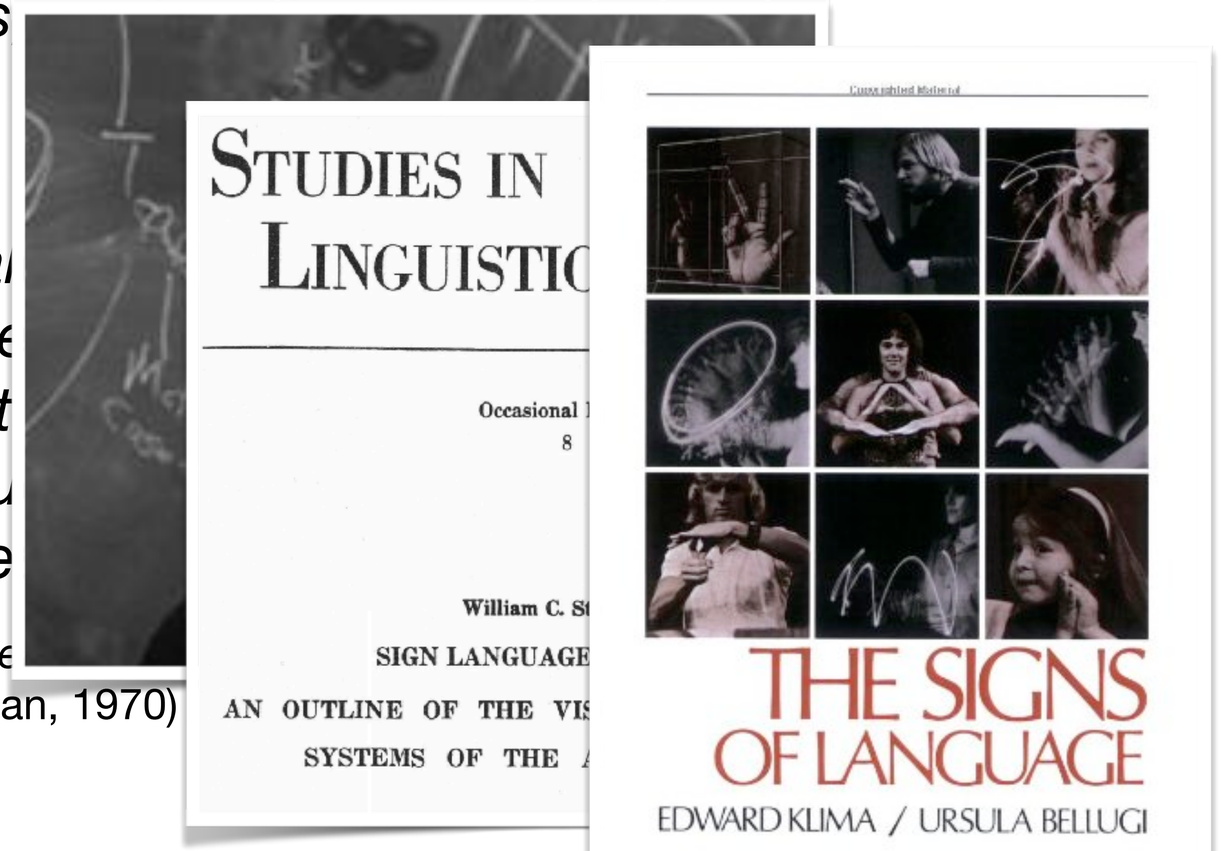

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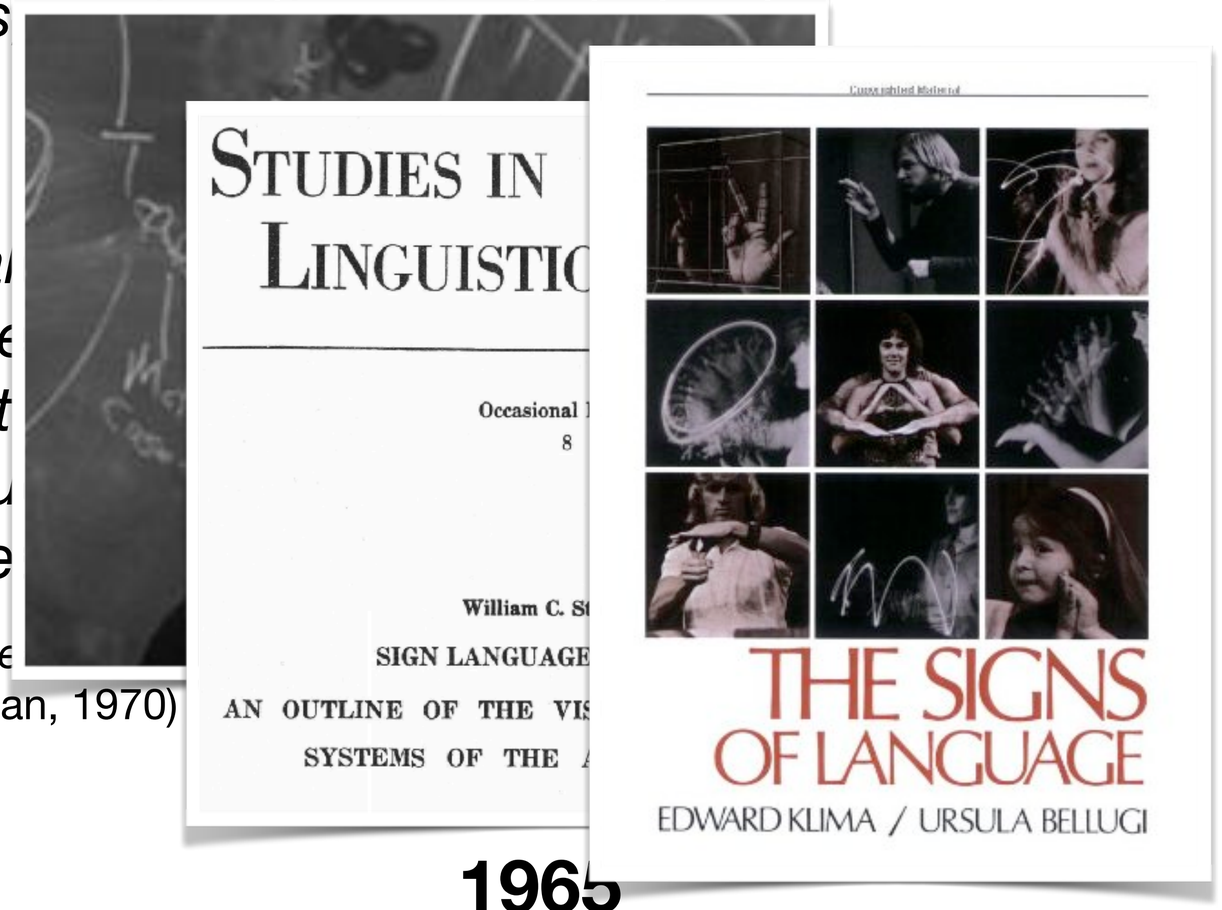

1965

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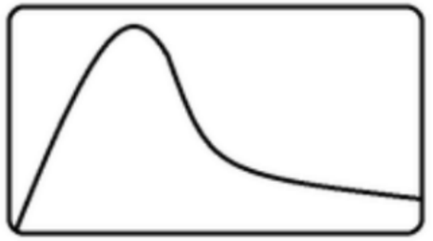
Language creation

Critical period of acquisition



Animal communication

Petition To Officially Recognize American Sign Language Reaches Threshold For White House Response

By ELIZABETH FLOCK

December 11, 2012 | RSS Feed | Print

President Clinton signs "I Love You" to the crowd after giving his acceptance speech for his nomination for re-election in 1996 in Chicago.

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Sign languages still lower in status compared to spoken language

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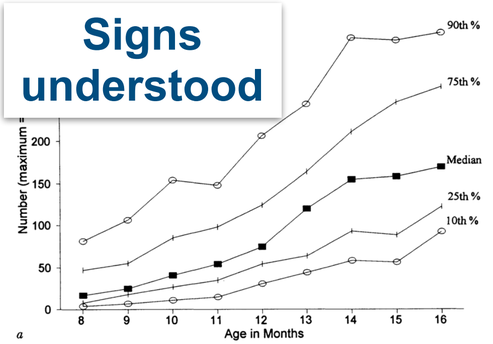
Plan for today

- What's ***not*** so special about sign language?



- What's special about sign language?

- How does learning a visual-manual language change acquisition?

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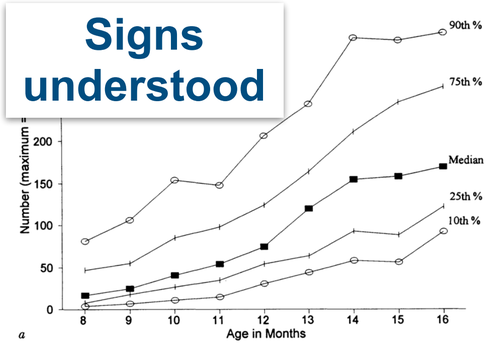

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What is a signed language?

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- **Visual-gestural:** expressed with the hands, arms, and face and perceived with the eye

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What is a signed language?

- **Visual-gestural:** expressed with the hands, arms, and face and perceived with the eye
- **Autonomous:** (unique languages- ASL, BSL, SSL) ~ 200 sign languages in use today
- **Linguistically complex:** grammatical characteristics found in spoken languages

Sub-lexical structure of signs

https://www.handspeak.com/learn/index.php?id=109

(Klima & Bellugi, 1979; Stokoe, 1960)

Sub-lexical structure of signs

- Signs are **not* global iconic wholes

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Sub-lexical structure of signs

- Signs are **not* global iconic wholes
- Like words, signs are constructed from separable, phonological parameters
  - Hand shape
  - Place of articulation
  - Movement
  - Palm orientation
  - Non-manual marker

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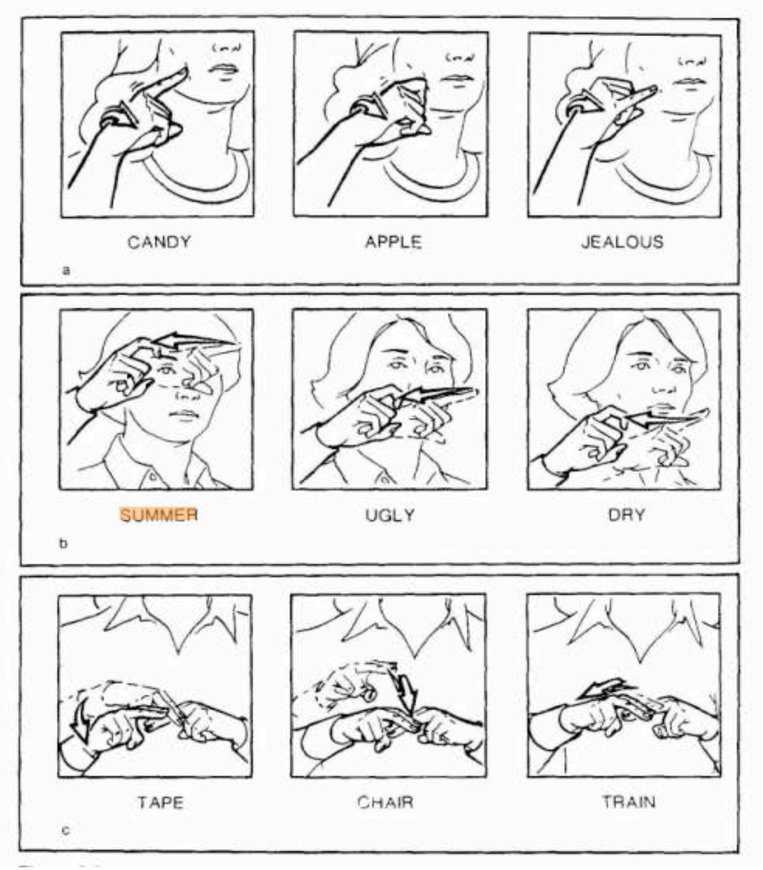

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(Klima & Bellugi, 1979; Stokoe, 1960)

More evidence fo sub-lexical structure: Co-articulation and “slips of the hand”

Newkirk, Klima, Pedersen, and Bellugi (1980)

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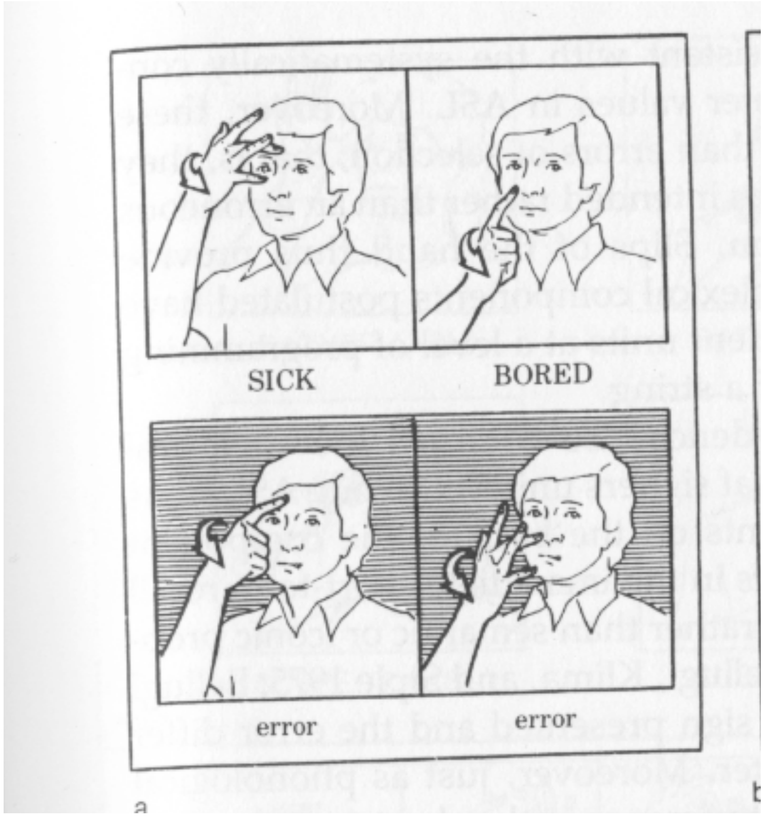

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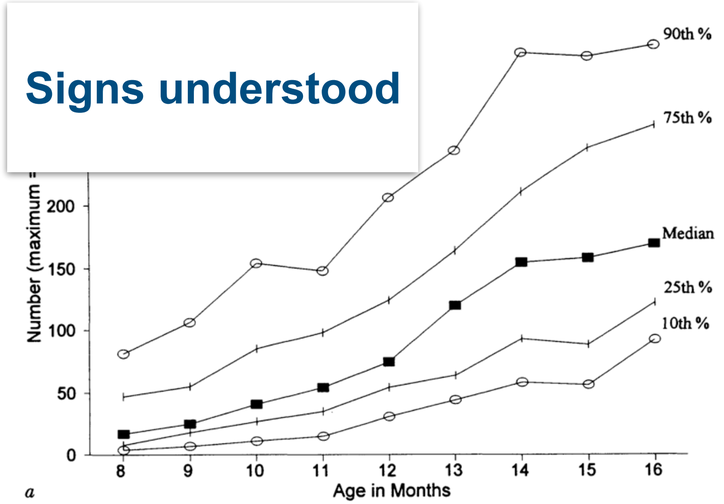
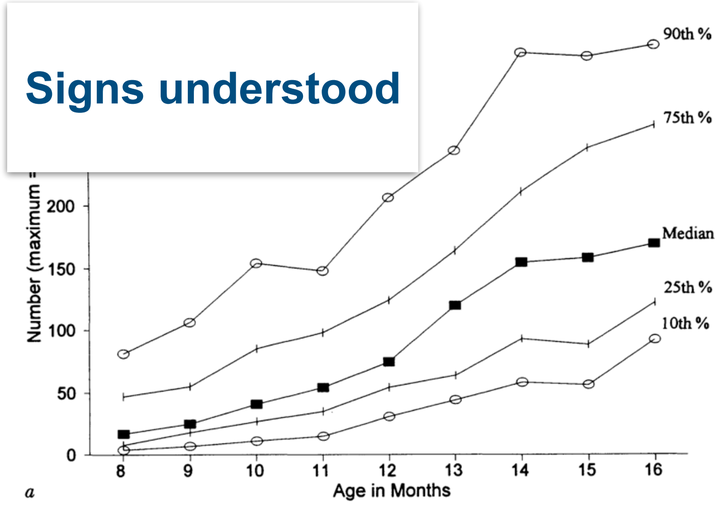
Parallel developmental trajectories



Lillo-Martin, 1999; Mayberry & Squires, 2006; Petitto & Marentette, 1991; Meier, 1991; Anderson & Reilly, 2002

Parallel developmental trajectories

- First signs are typically produced around 12m



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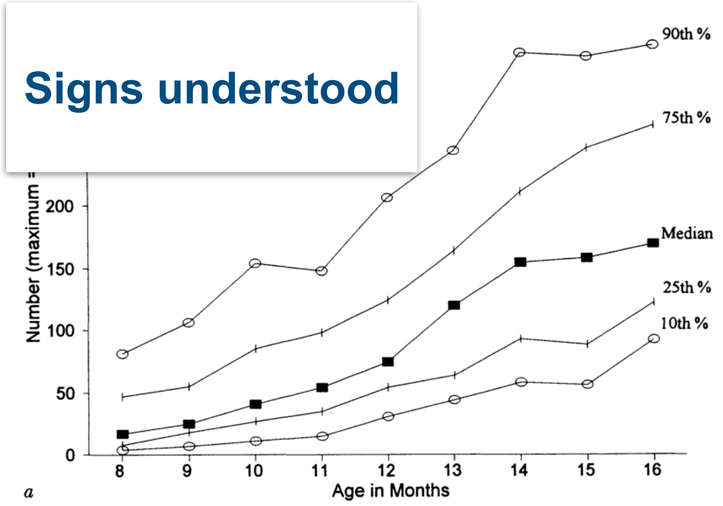

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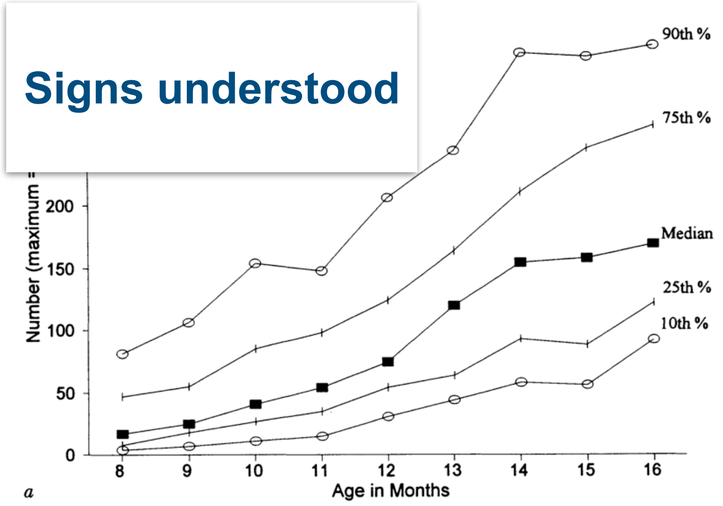

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Parallel developmental trajectories

- First signs are typically produced around 12m
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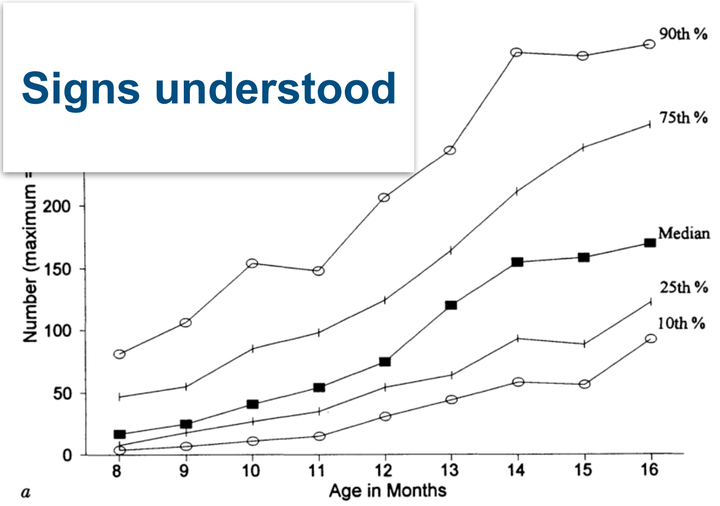
- More nouns in the early lexicon
- Use similar language learning mechanisms — e.g., mutual exclusivity



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Early advantage for sign language?

Anderson and Reilly (2002); Meir and Newport (1990)

Early advantage for sign language?

- early vocabulary development in speech lagged early vocabulary development in sign by 1-1/2 to 2 months
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- the advantage for ASL disappears by 18– 23 months.

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Issues with early research on “baby sign”

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10 months	0.00 (0.00)	0.00 (.00)
12 months	0.20 (0.42)	0.70 (1.06)
16 months	6.60 (5.78)	6.22 (5.09)*
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“Based on our findings, there is little support for the notion that gestural intervention is necessary for healthy developing infants raised in an environment where the quality and quantity of linguistic input is good.”

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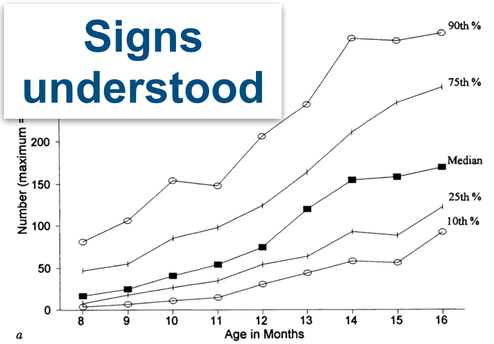
Plan for today

- What's ***not*** so special about sign language?



- What's special about sign language?

- How does learning a visual-manual language change acquisition?

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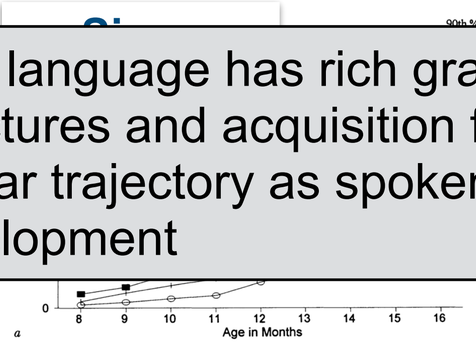
Sign language has rich grammatical structures and acquisition follows similar trajectory as spoken language development



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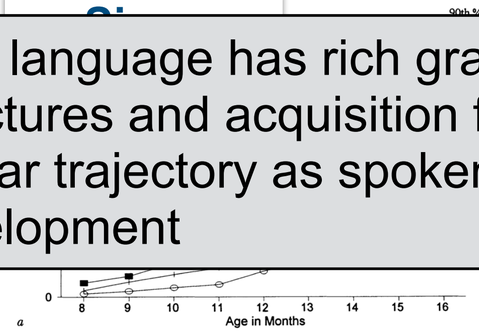

What’s *special* about sign language?

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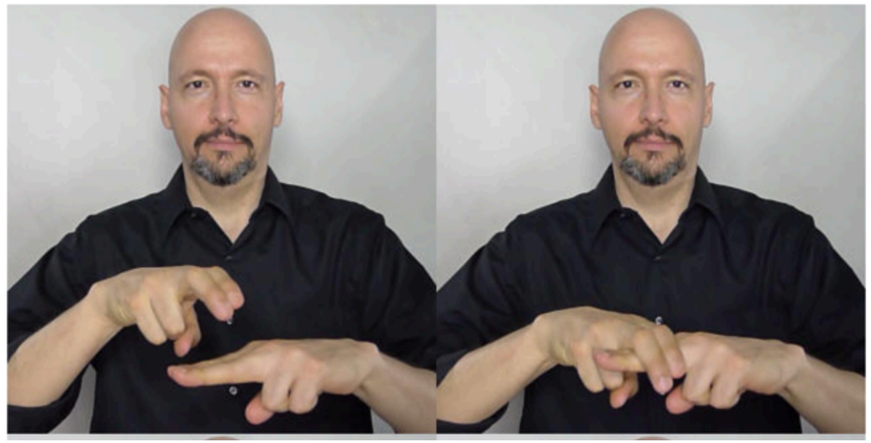

SIT **CHAIR**

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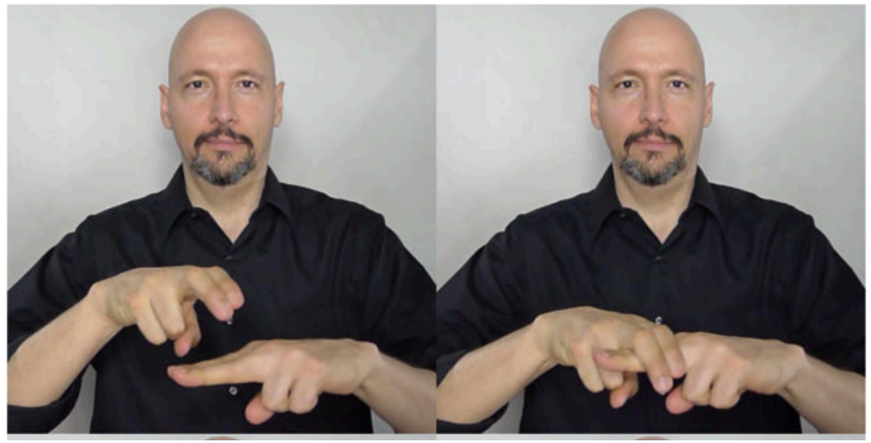

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Inflectional morphology

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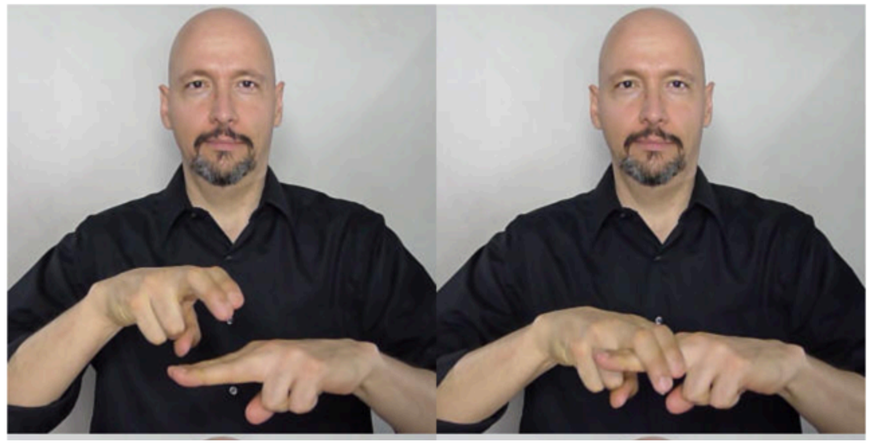

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Inflectional morphology

MEASURE **activity of measuring**

What's *special* about sign language?

Using space to convey who did what to whom

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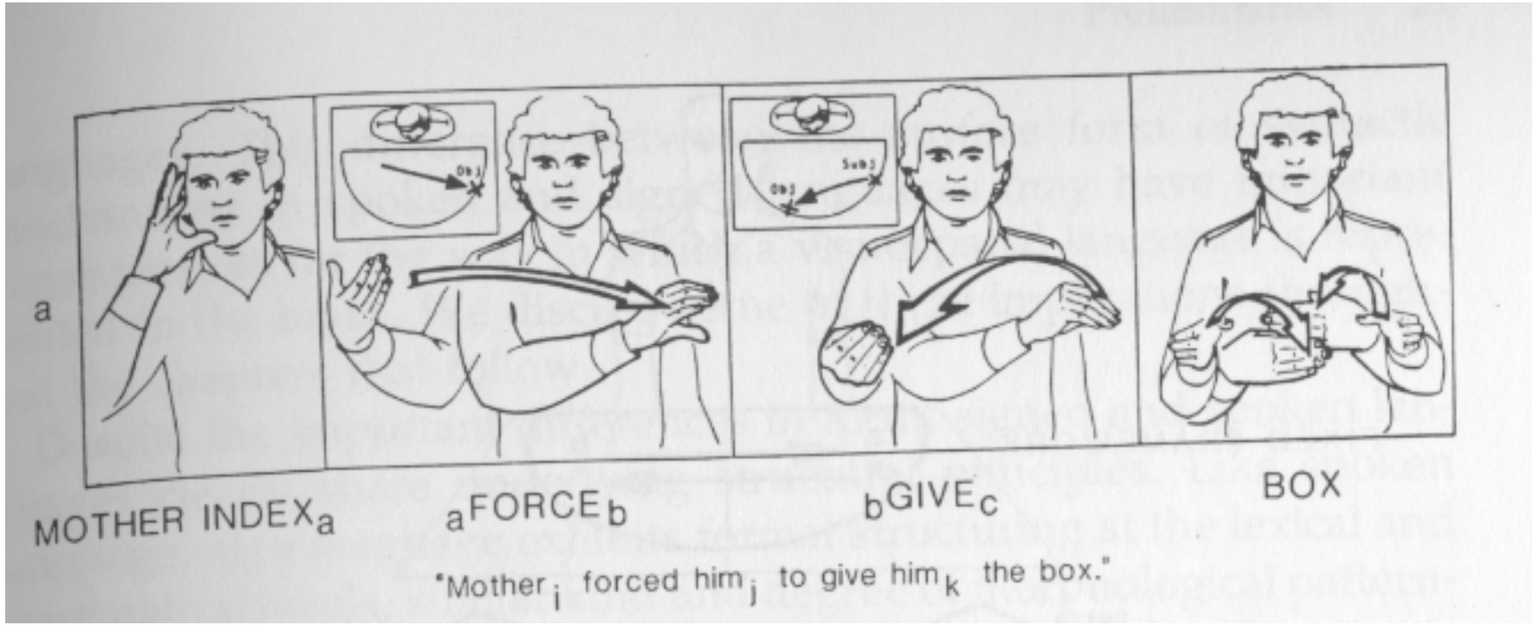
Using space to convey who did what to whom



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(A)

MM

TH

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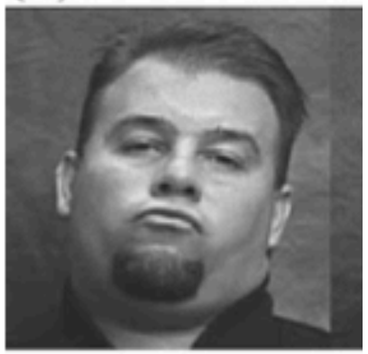

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MM (lips pressed together and protruded) indicates an action done effortlessly

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wh- questions

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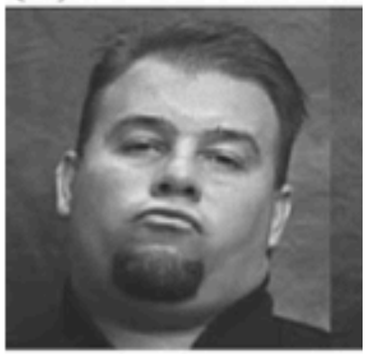

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yes/no questions

PLAY
"Are you playing?

What's *special* about sign language?

Iconicity

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TREE – in 3 signed languages

American Sign Language Danish Sign Language Chinese Sign Language

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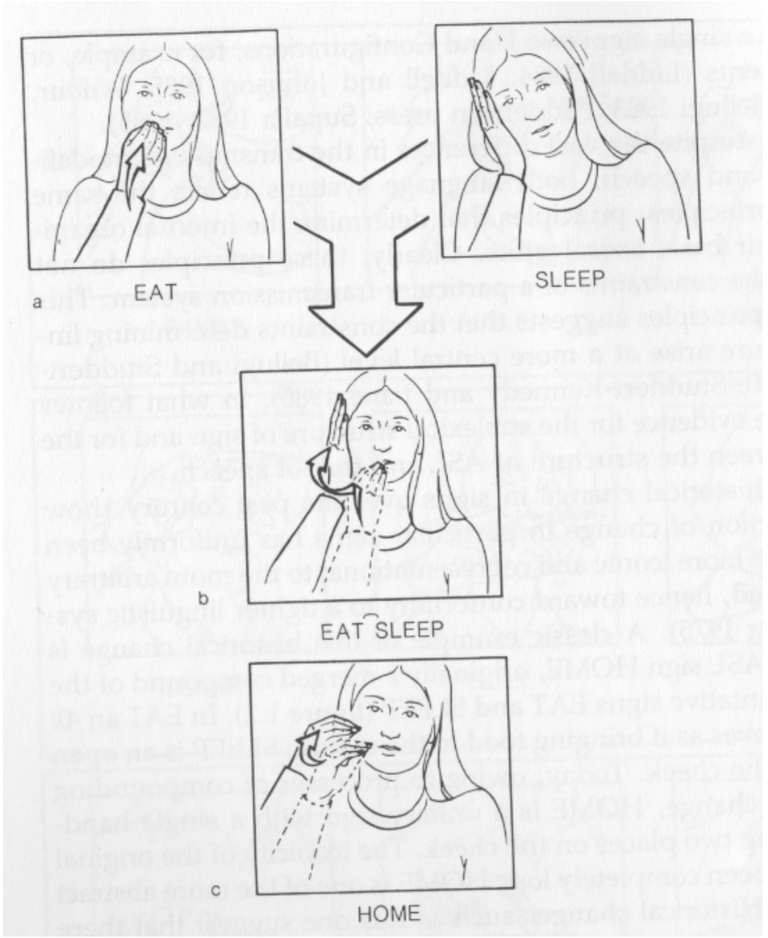

Does iconicity influence acquisition?

Evidence in support

Evidence against

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- Proficient signers are actually slower to translate iconic signs compared to arbitrary ones from ASL to English (Baus, Carreiras, & Emmorey, 2013).

Plan for today

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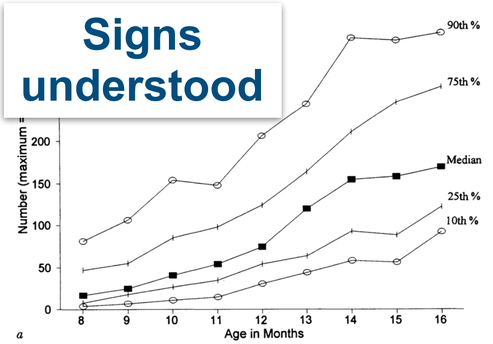

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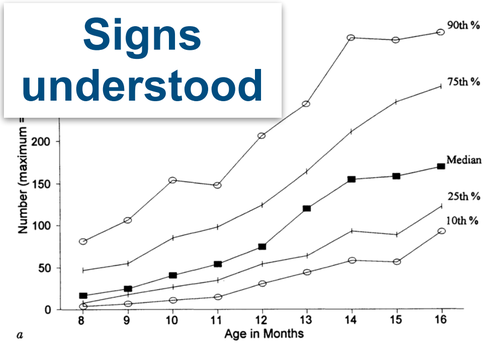

- What's special about sign language?

American Sign Language Danish Sign Language Chinese Sign Language

- How does learning a visual-manual language change acquisition?

“Look at the doll!”

“Look at the doll!”

“Look at the doll!”

“Look at the doll!”

“Look at the doll!”

“Look at the doll!”

children must ***decide*** what visual information to gather

How does learning a sign language change gaze dynamics during language comprehension?

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Study: signed vs. spoken language [**children**]

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Theory: Information-seeking account

Visual world paradigm to study the real-time allocation of visual attention

(Allopenna, Magnuson, & Tanenhaus, 1998; Altmann & Kamide, 2007; Tanenhaus, Spivey-Knowlton, Eberhard, & Sedivy, 1995)

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“The boy will move the cake.”

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*“The boy will **eat** the cake.”*

listeners shift visual attention at “eat”, anticipating the noun “cake”

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Adapting the VWP for sign language

Sentence-initial question:
“WHERE [DOLL]?”

Adapting the VWP for sign language

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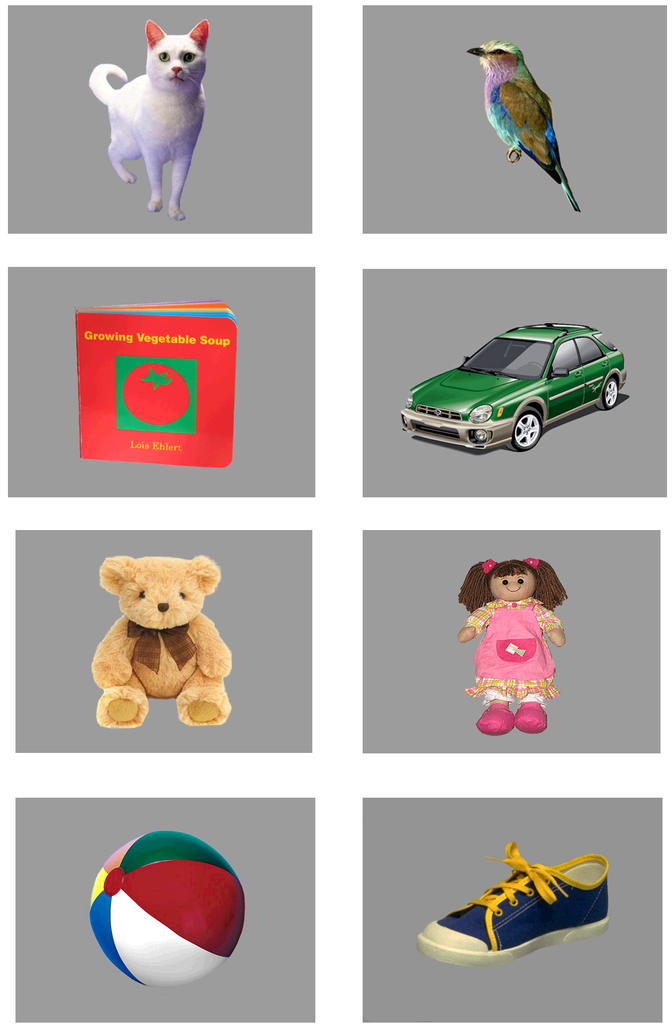
Adapting the VWP for sign language

Linguistic Stimuli

- Four yoked pairs of eight target nouns
- Familiar to most children in target age range
- Minimal phonological overlap in ASL



HEY! LOOKING FOR BALL WHICH? YAY!

Signer on

Carrier phrase onset

Target noun onset

Question sign onset

Encouragement

Signer off

Images appear for two seconds prior to signer appearing

Signer holds question sign for two seconds to give child time to look at the images

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how to define the start of the target sign?

Look! Where's the **ball**?

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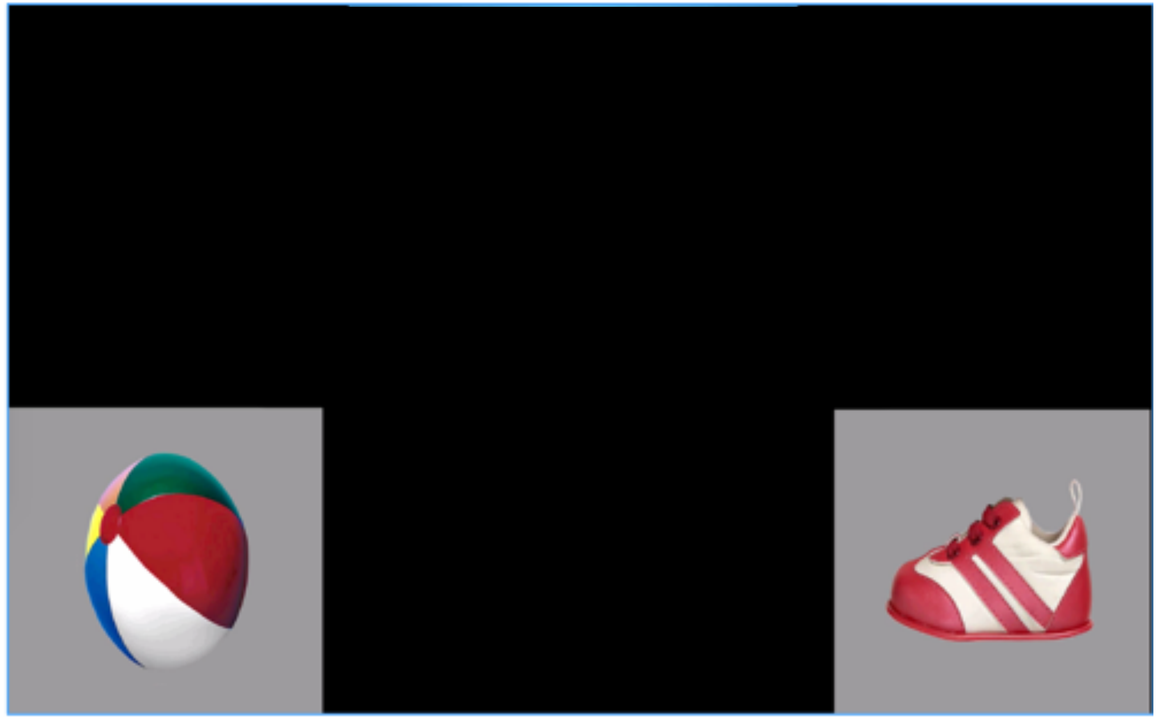

Look! Where's the **ball**?

Study 1: comparing children's eye movements in spoken vs. signed language comprehension

n = 110; ~27 in each group; **1.5-3 years of age**
32 trials; eye movements coded at 33ms resolution

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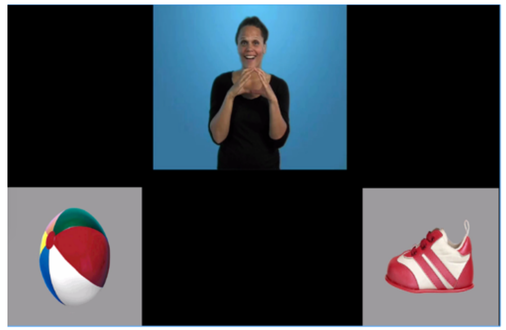
ASL



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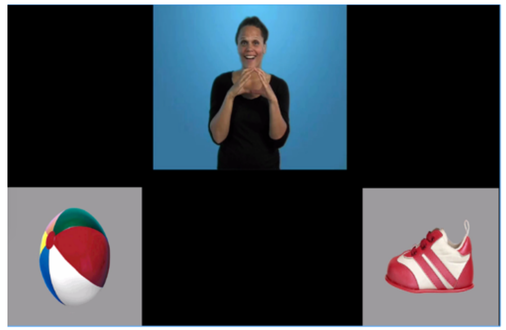
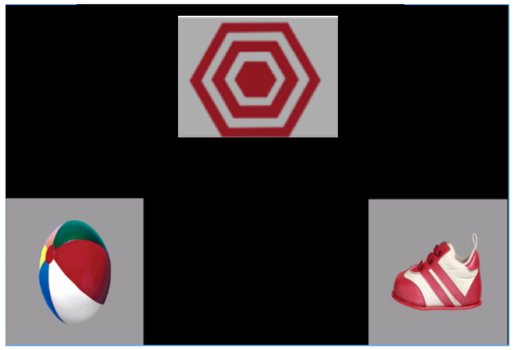


Bullseye



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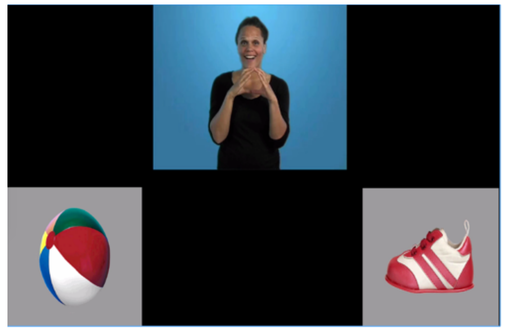

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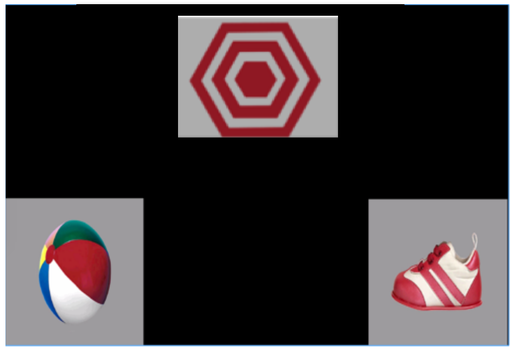
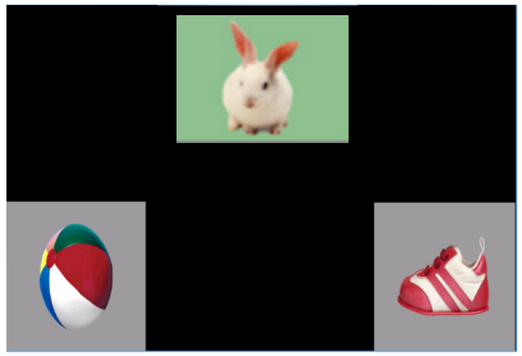


Object



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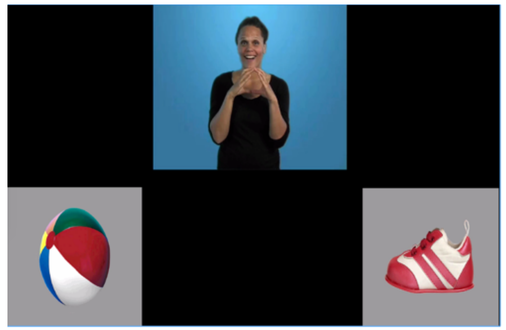

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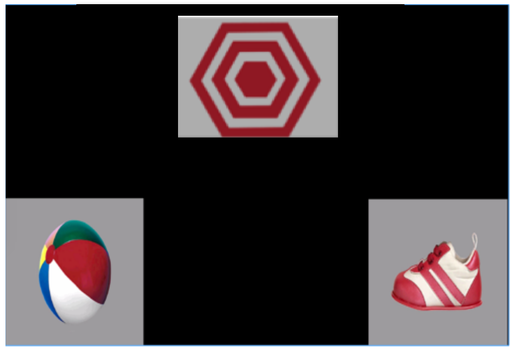

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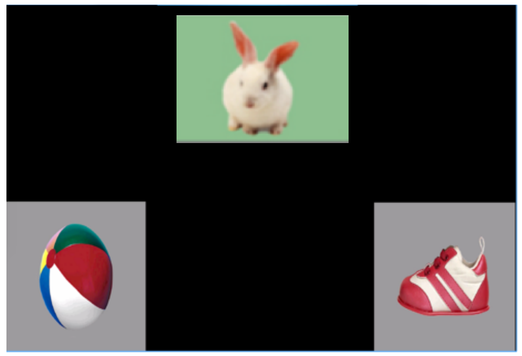
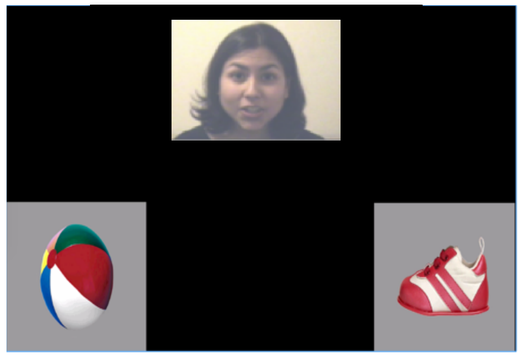


Face



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What does the task look like?

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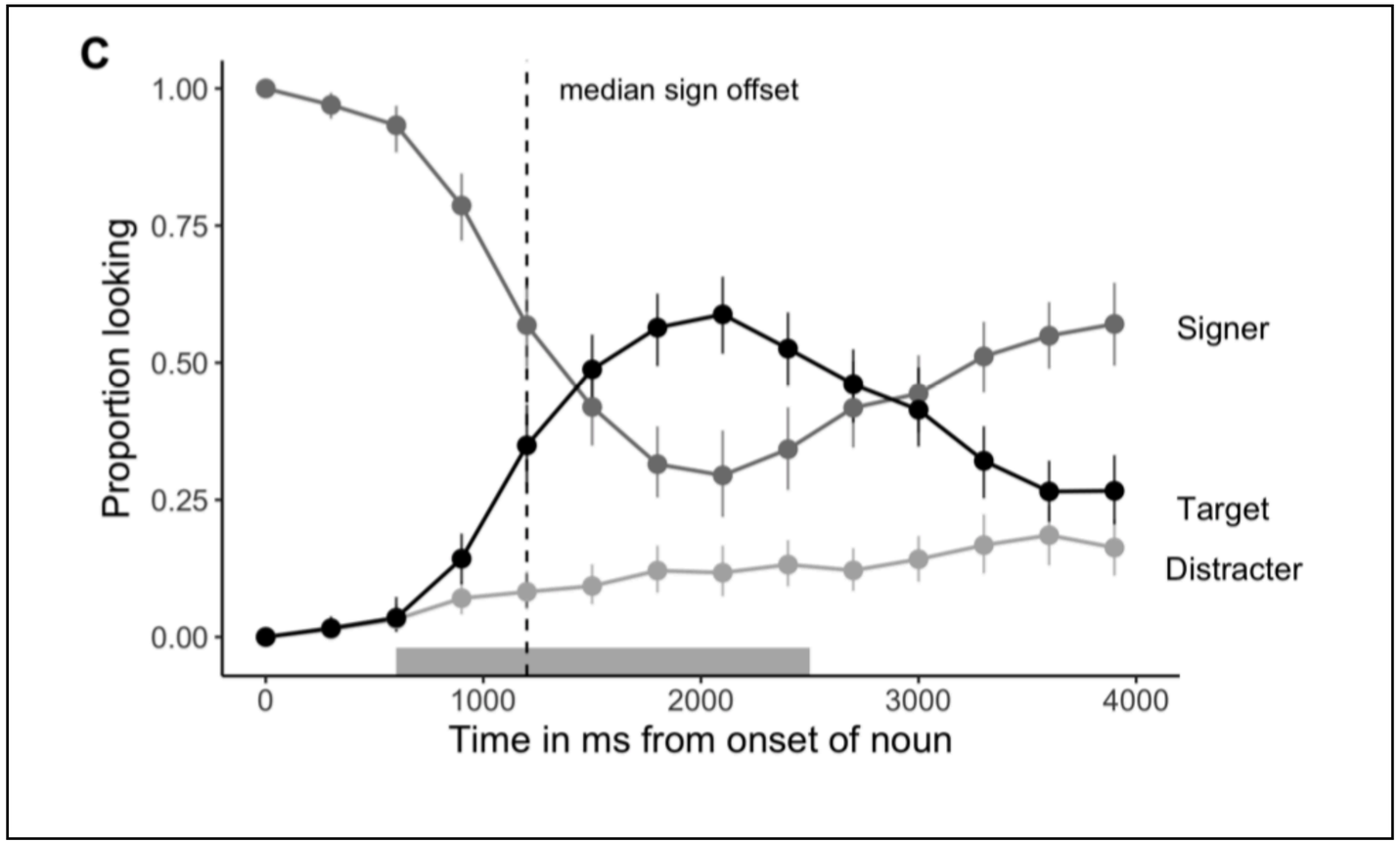
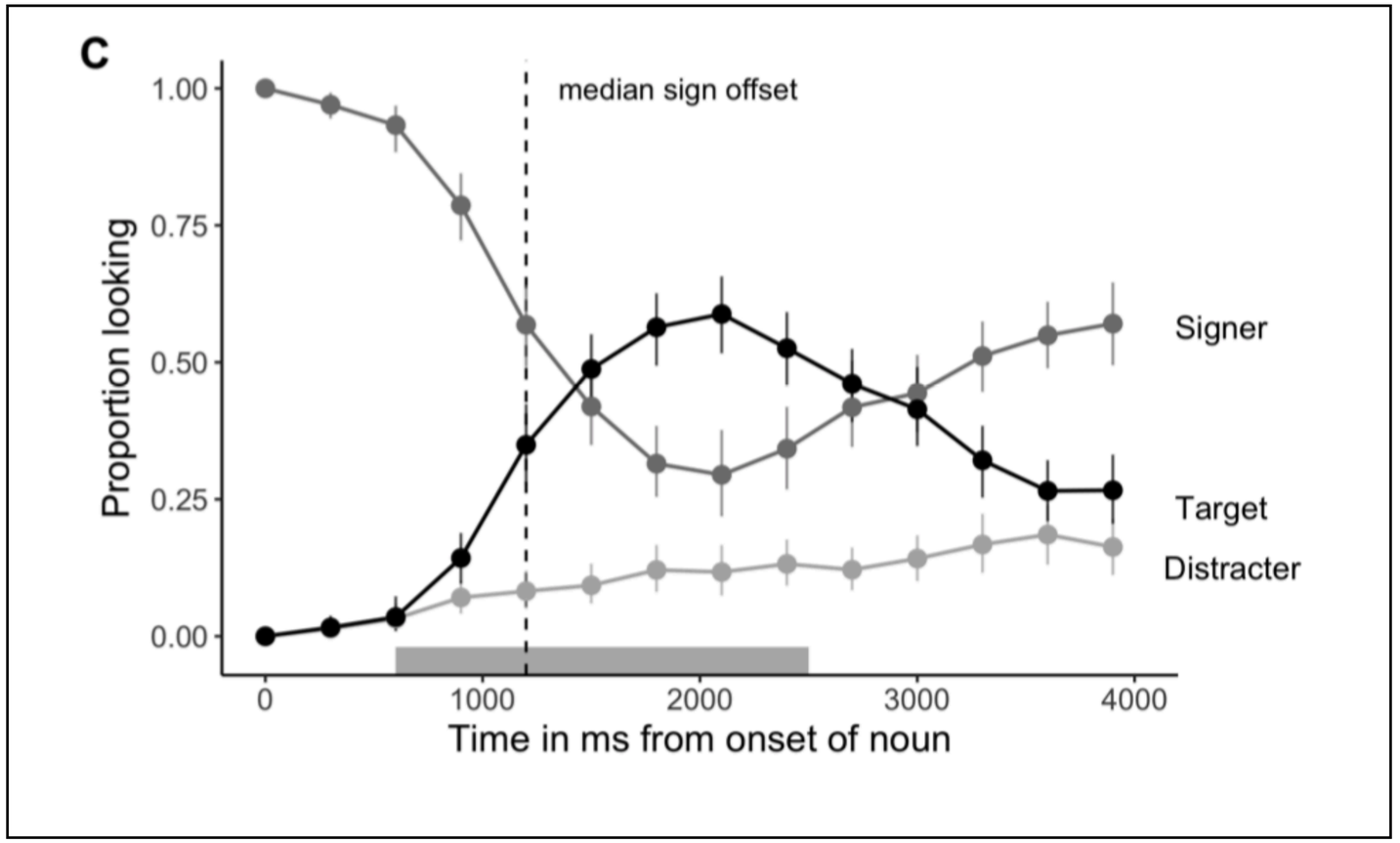

C
median sign offset
1.00
0.75
0.50
0.25
0.00
Proportion looking
Signer
Target
Distracter
0
1000
2000
3000
4000
Time in ms from onset of noun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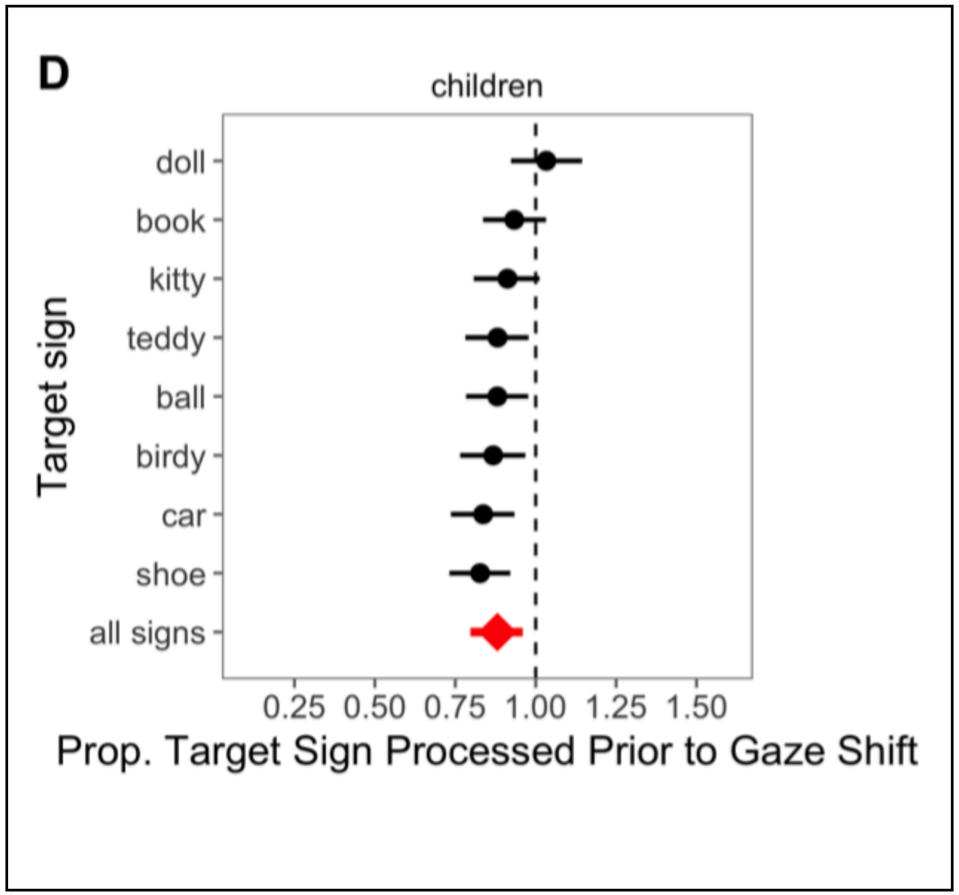
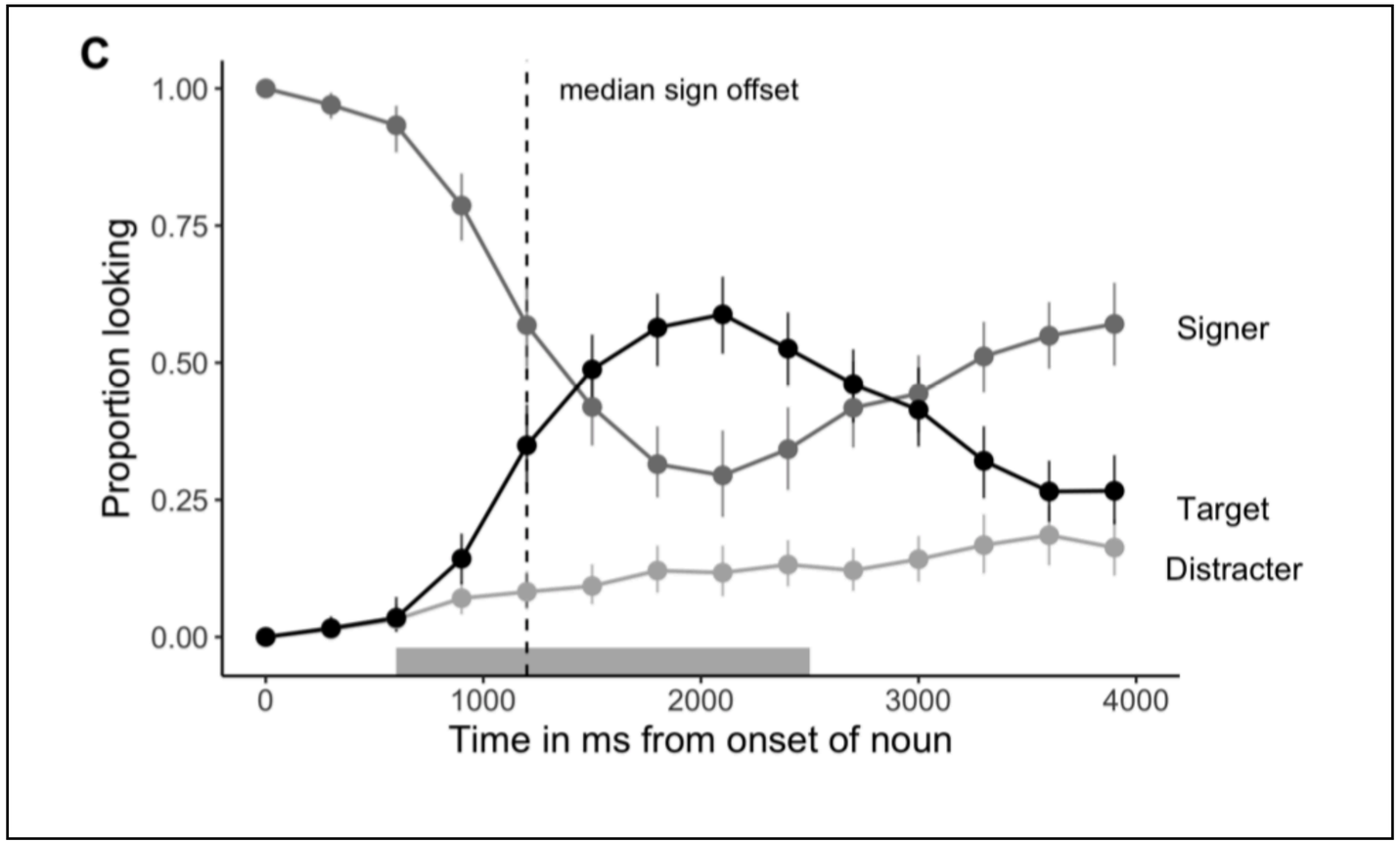
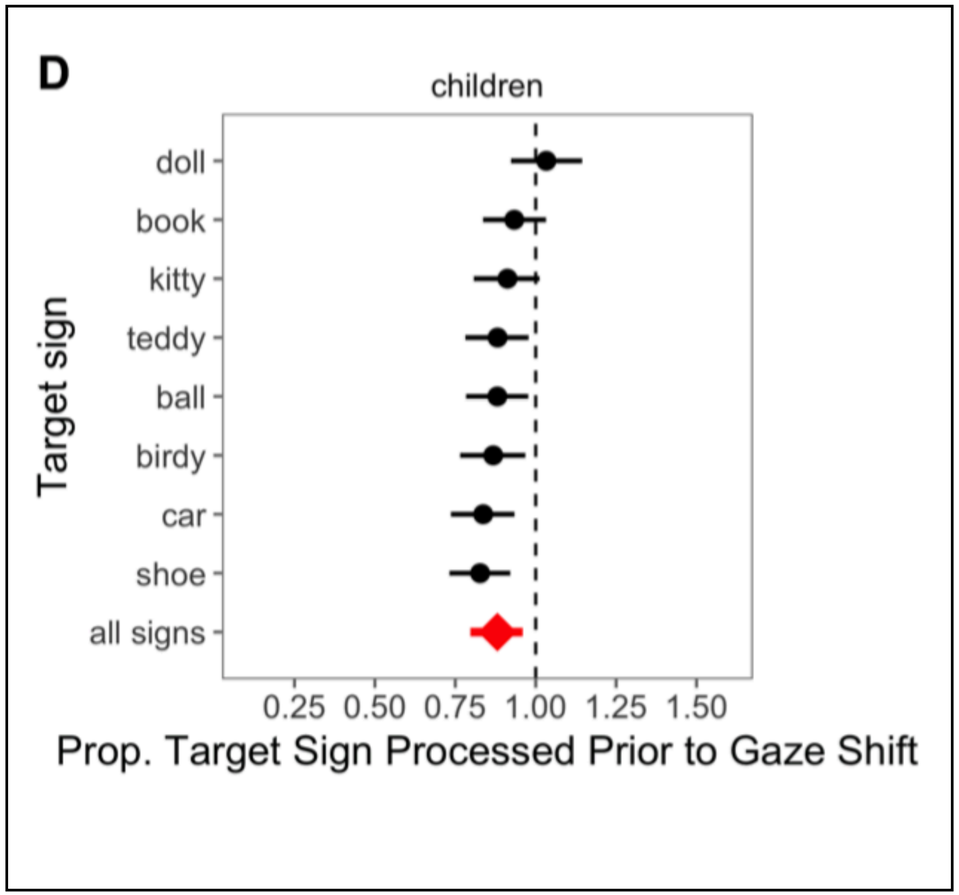
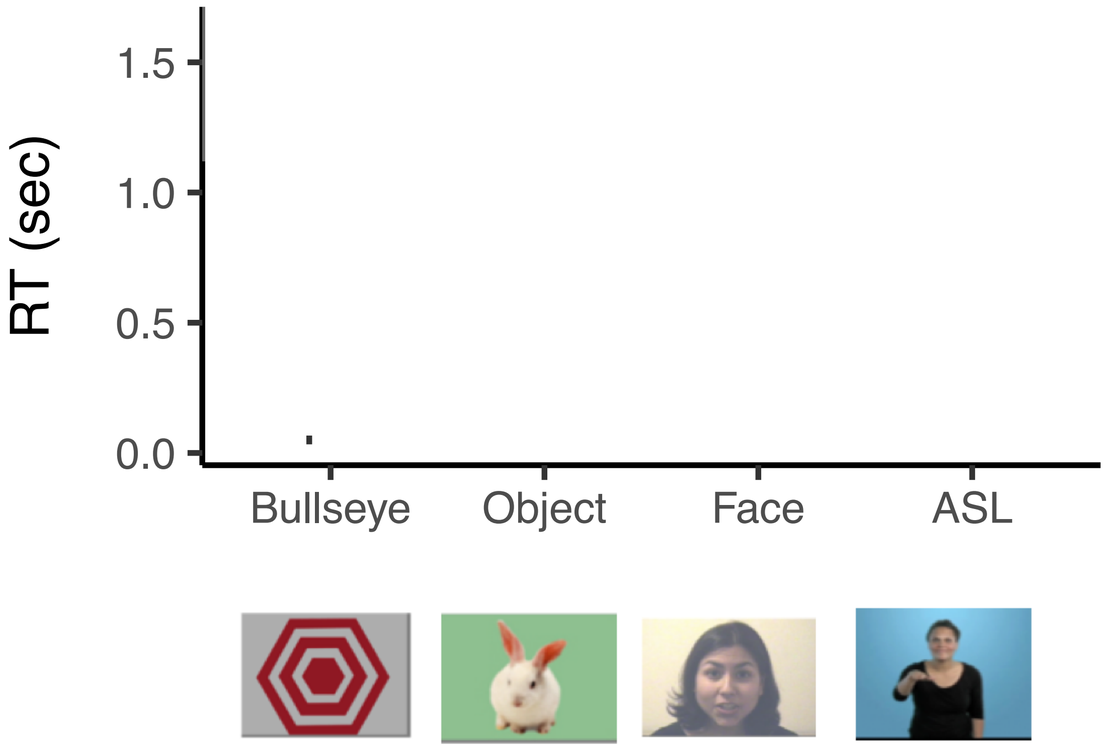

D
children
Target sign
doll
book
kitty
teddy
ball
birdy
car
shoe
all signs
0.25
0.50
0.75
1.00
1.25
1.50
Prop. Target Sign Processed Prior to Gaze Shift





Robust link between processing a lexical symbol and allocating visual attention to an object regardless of language modality

First shift Reaction Time (RT) and Accuracy



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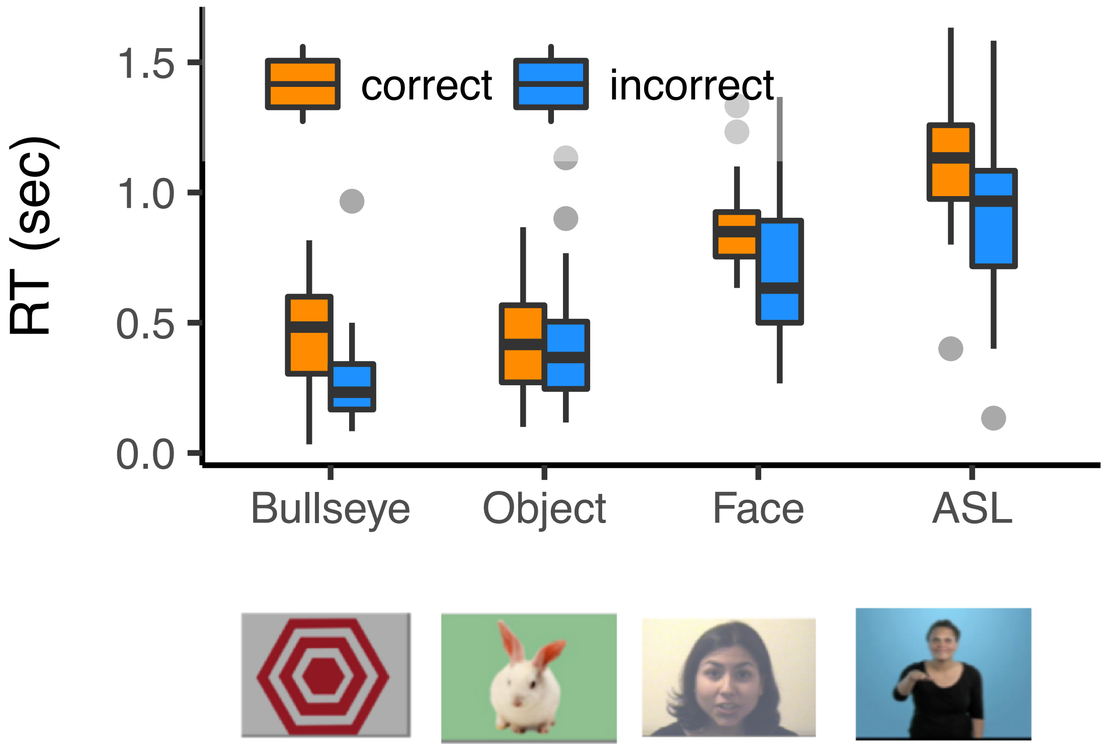

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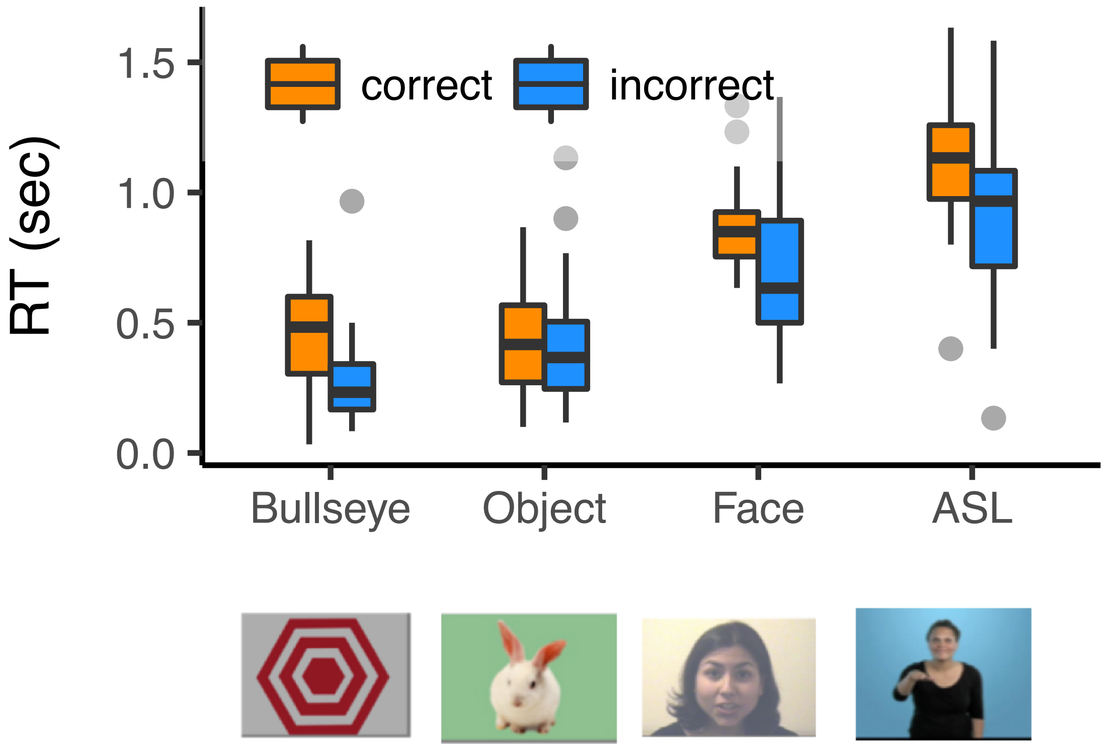

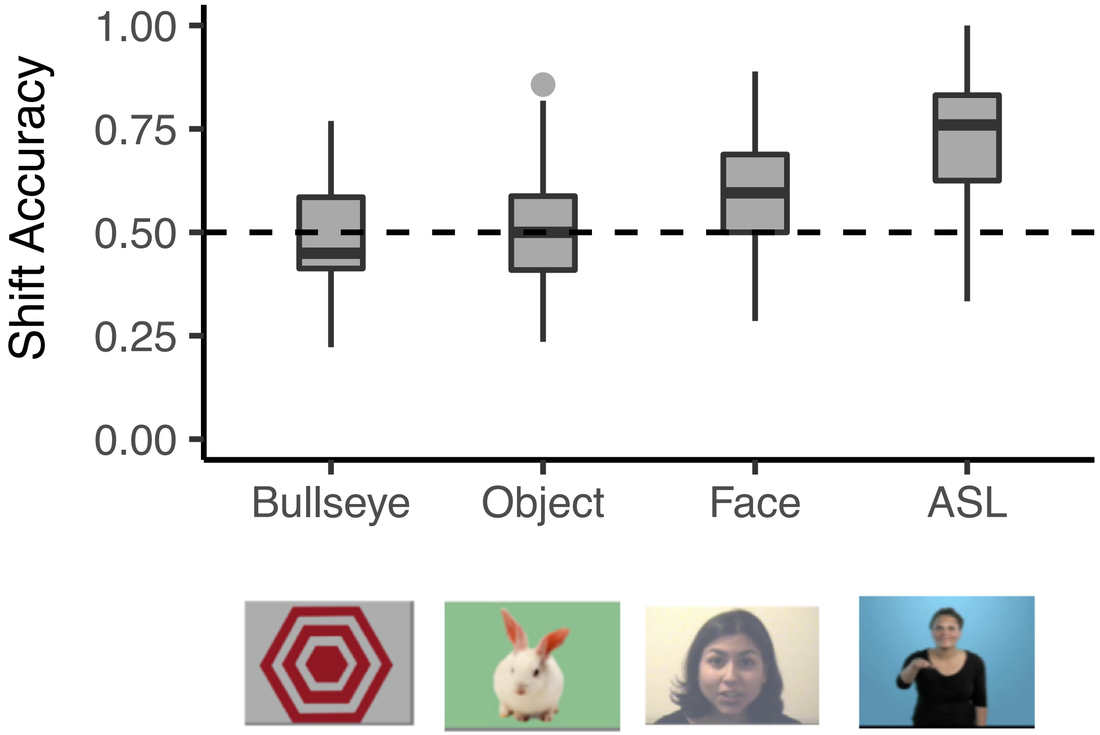

Information-seeking account

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Children are slower to disengage because they are accumulating more language-relevant visual information

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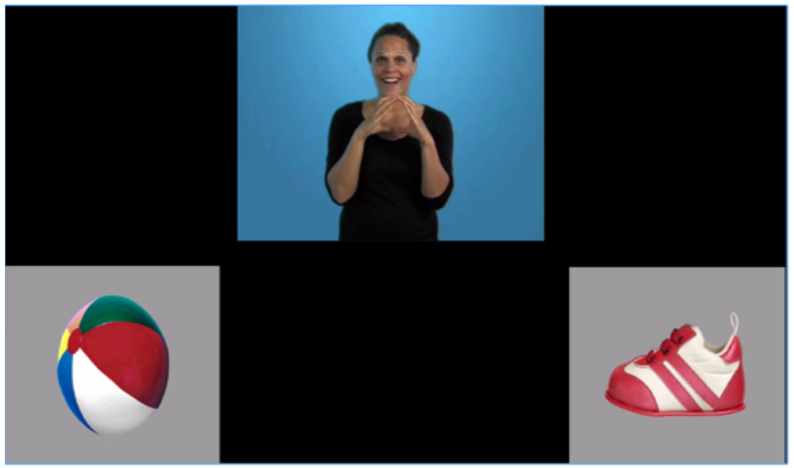

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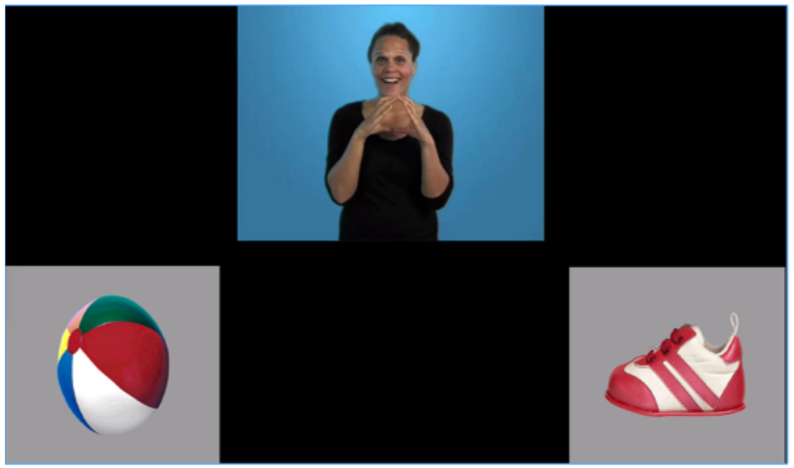

Low ⟷ High

relevance for
language comprehension

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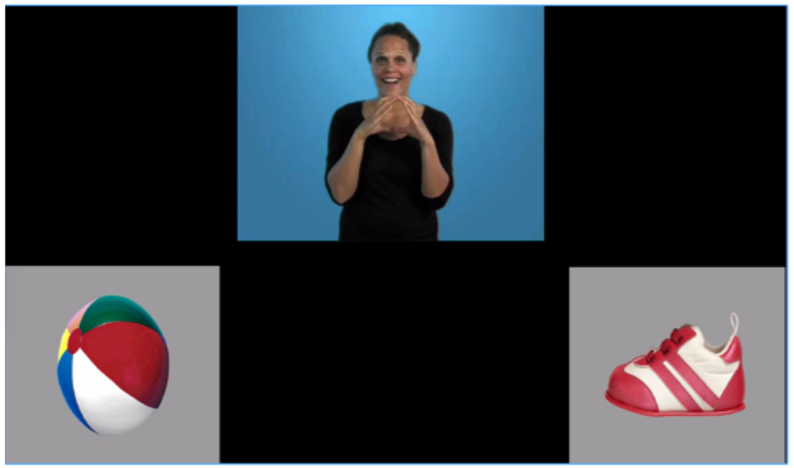

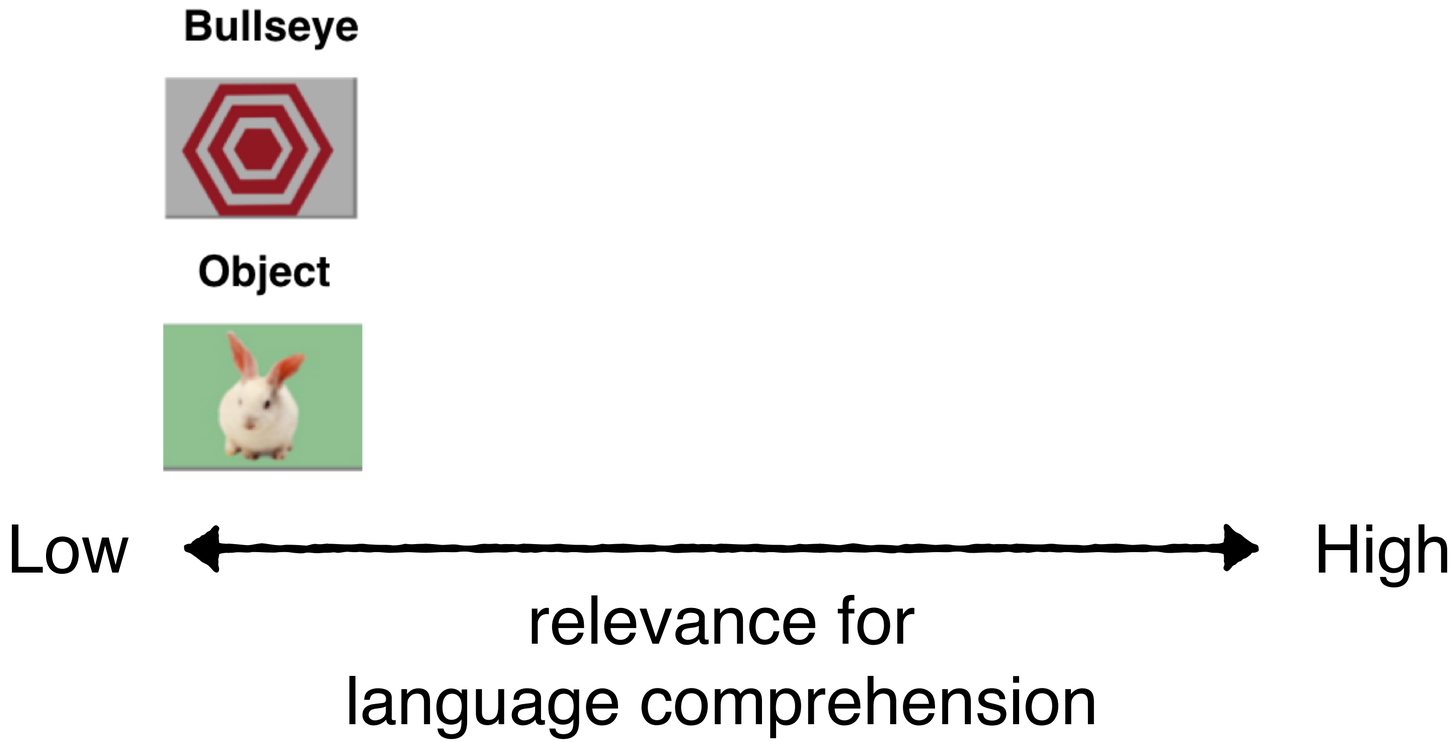

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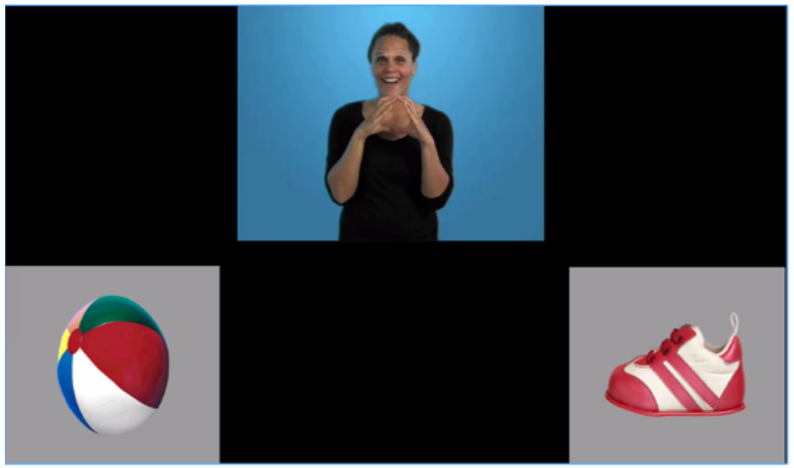

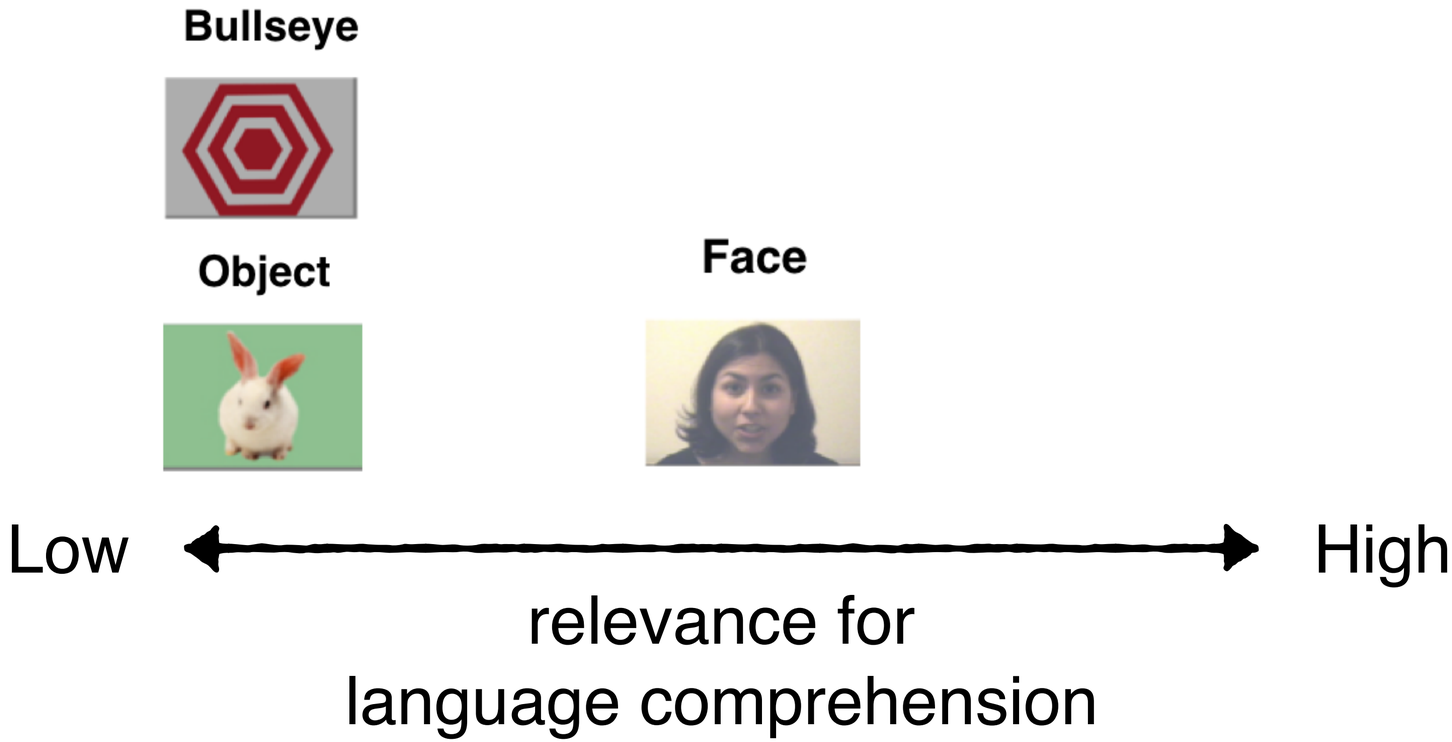

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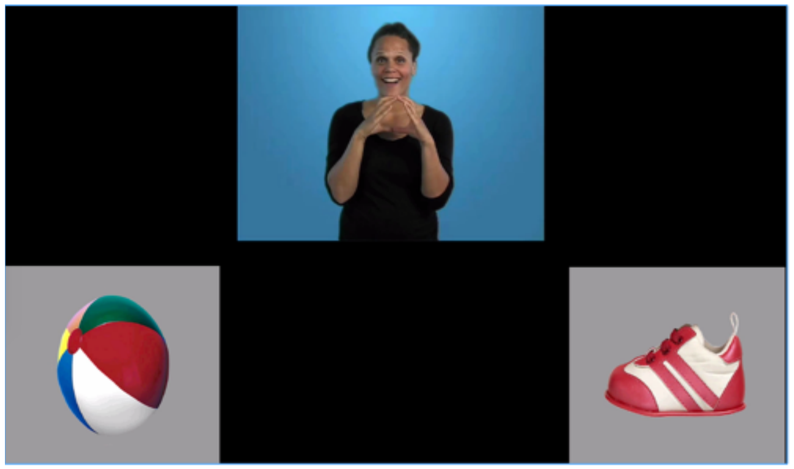

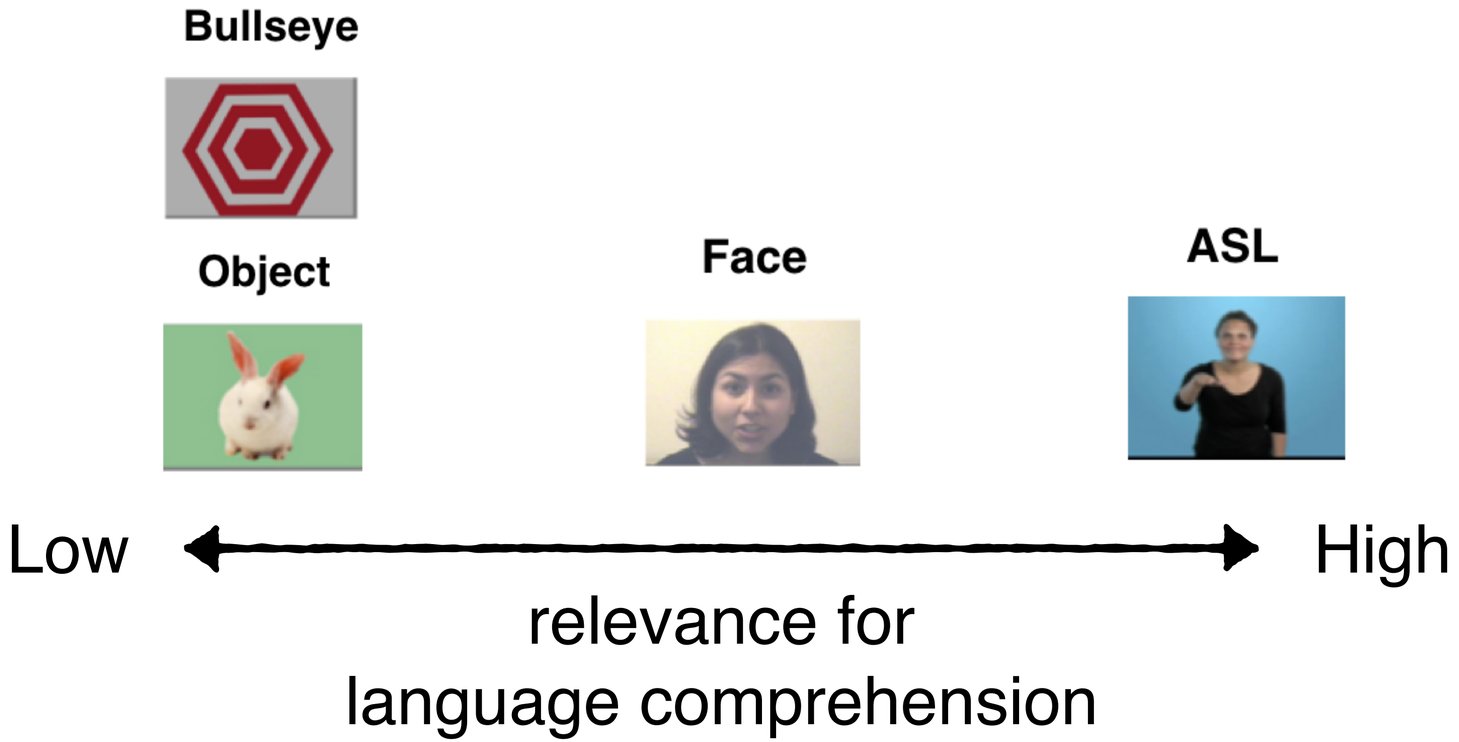

Takeaway points

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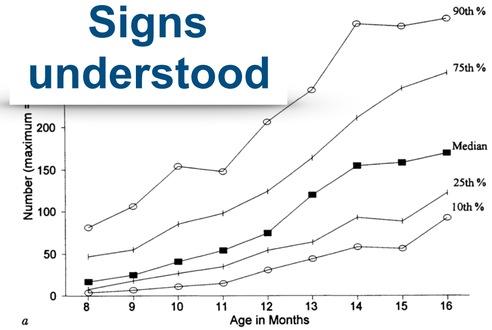
- Sign has rich sub-lexical and grammatical structures. Acquisition follows a similar trajectory as spoken language



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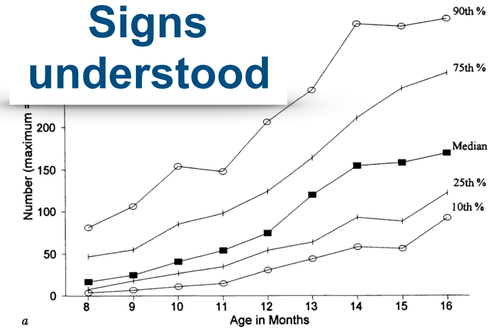

- Sign is unique in its use of: 3D morphology, spatial syntax, grammatical facial expressions, and iconicity

American Sign Language Danish Sign Language Chinese Sign Language

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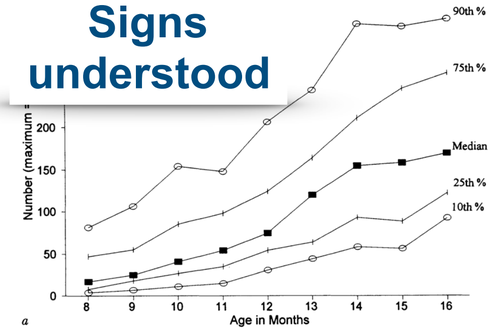

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- Learning to sign presents unique challenges that can change the acquisition process, e.g., information gathering via eye movements