

# Lecture 6: Gesture

COGS 153

# Gesture is prevalent in conversation

- **Gestures** are movements of the body that are produced in the course of communication
  - They are produced along with utterances or used as utterances in themselves
- Gestures *\*are not\** movements that are instrumental actions (e.g., tying a ponytail, scratching, etc.)



# Types of gestures

**iconic gestures** depict a concrete visuospatial idea

**metaphoric gestures** depict an abstract idea in visuospatial form

**emblems** have a conventional meaning within a community

**deictic gestures** indicate something that is being referred to

**beat (or emphatic) gestures** keep time with language but do not do much else, can be used for emphasis

# Types of gestures

Some examples:

**iconic gestures**

opening gesture with “opened the door”

**metaphoric gestures**

sweeping gesture with “it took a decade”

**emblems**

thumbs up gesture with “everything went fine”

**deictic gestures**

pointing gesture with “it’s over there”

**beat (or emphatic) gestures**

gesture with point of emphasis

# Types of gestures

**iconic gestures**

\*\* Note: not all gestures will fall neatly into one category

**metaphoric gestures**

**emblems**

**deictic gestures**

**beat (or emphatic) gestures**

# What do you notice?



<https://youtu.be/hWLF6JFbZoo?t=9>

6  
0:20-0:24

# What do you notice?



<https://youtu.be/q5nVqeVhgQE?t=449>

7  
7:31-8:01

# How do gestures relate to speech?

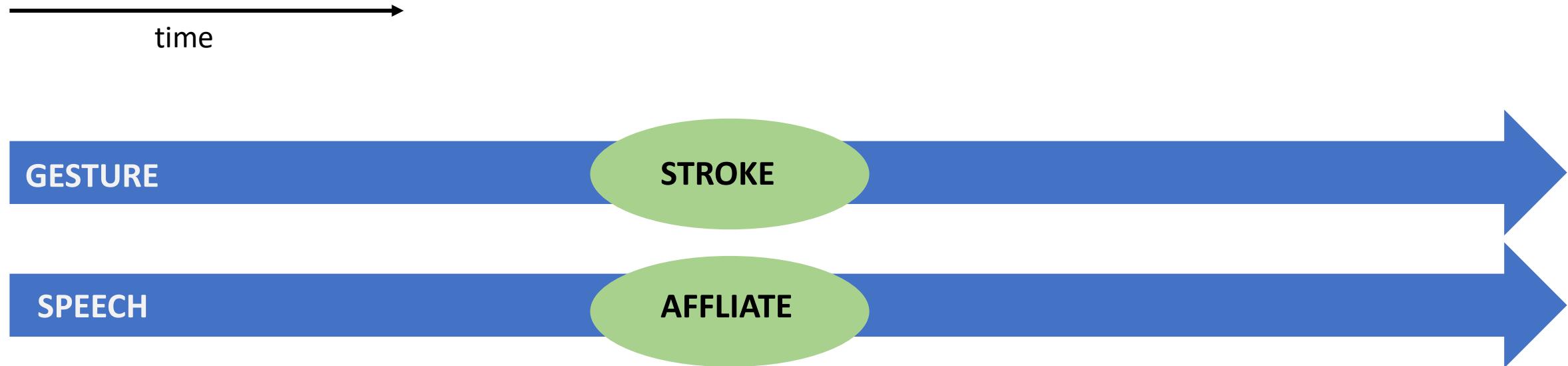
- Sometimes they occur in the absence of speech



# How do gestures relate to speech?

- Sometimes they occur in the absence of speech
- When gestures and speech co-occur, they are tightly integrated in both timing and meaning

# Co-timing



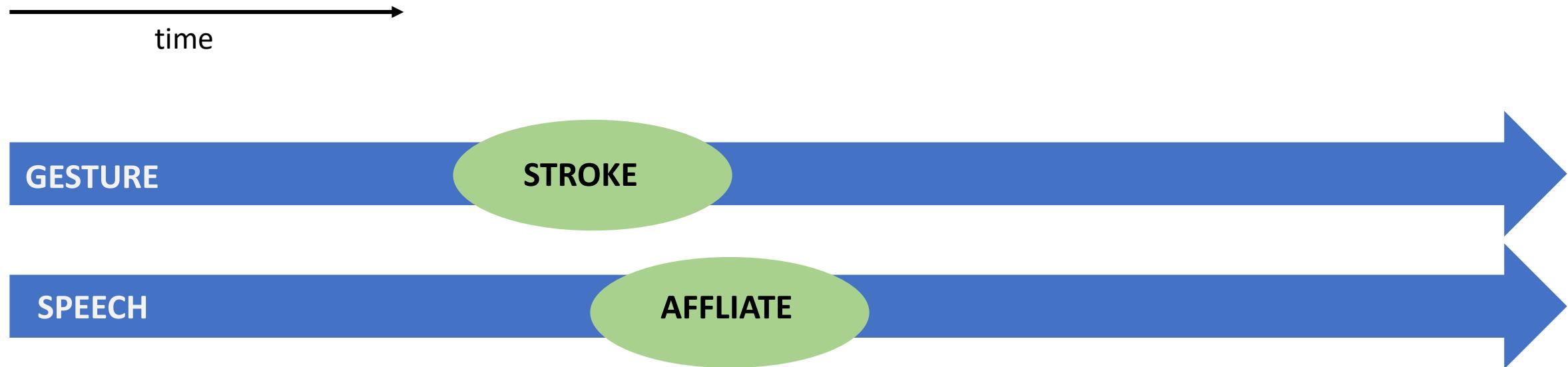
## **GESTURE STROKE =**

The most meaningful part of  
the gesture, produced with  
the most intensity

## **LEXICAL AFFILIATE =**

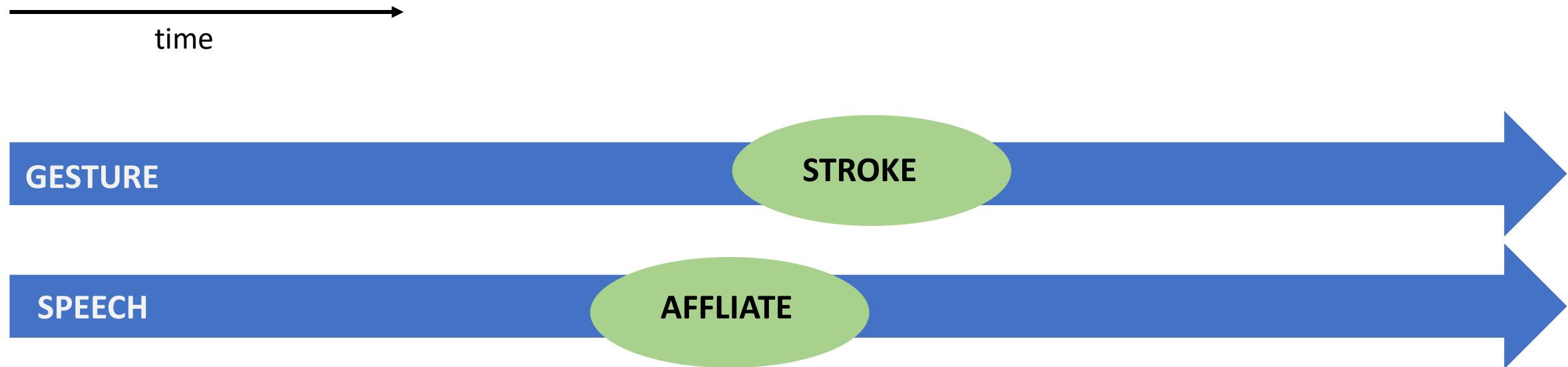
Spoken word (or short phrase)  
that most closely relates to  
the gesture

# Co-timing



gesture strokes often precede their affiliates  
in speech

# Co-timing



... but it is **very rare** for them to come after  
their affiliates!

# How do gestures relate to speech?

- Sometimes they occur in the absence of speech
- When gestures and speech co-occur, they are tightly integrated in both timing and meaning
- Co-speech gestures can add new meaning, or complementary information

# Does gesture enhance comprehension of speech?

## Beattie and Shovelton (1999)

- Researchers gave comic strips to people and asked them to describe what happened in the comic
  - Some people produced iconic gestures that depicted different events in the cartoons
- Next, they had new participants watch clips of these people's narrations either *with* or *without* video
  - So some participants got to see the accompanying gestures
- Results:
  - Ppts who were able to see the gestures answered **more comprehension questions correctly** than those who did not see the gestures

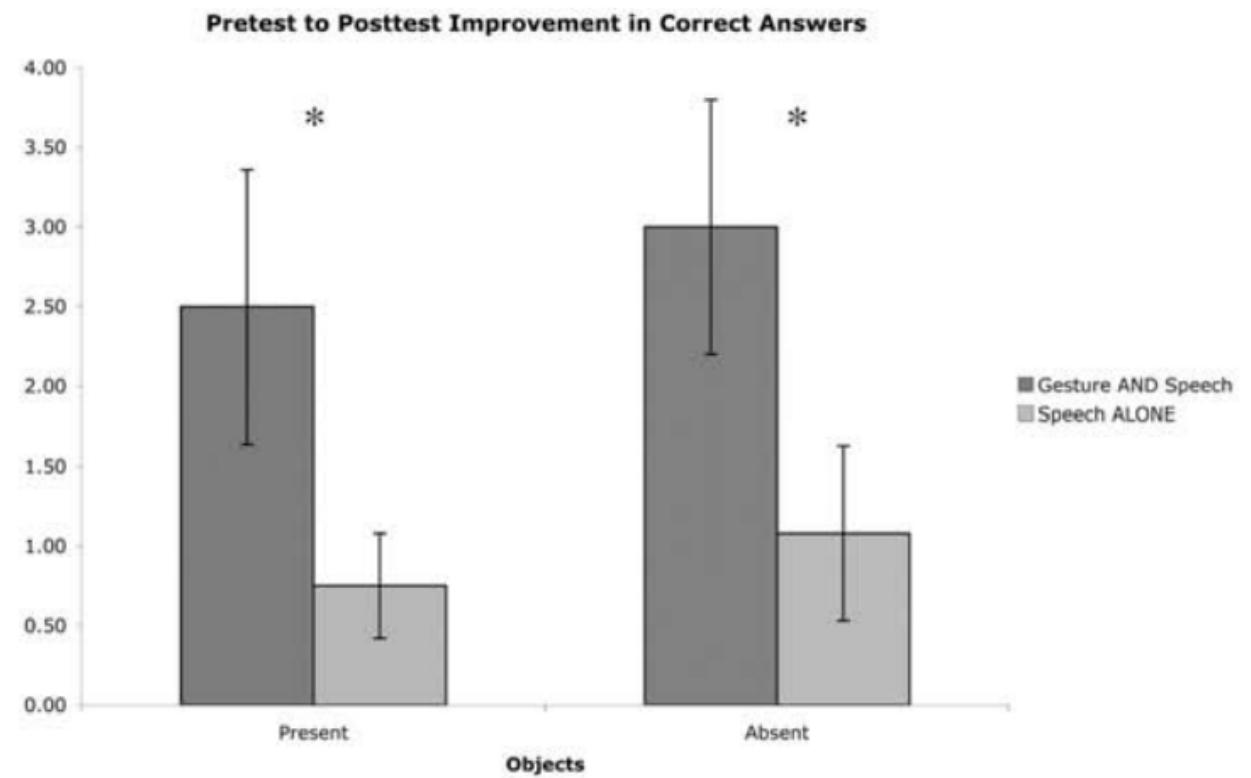
# Do some listeners benefit more from gesture than others?

- Asked children problems on *conservation*
  - (ability to understand that some properties are conserved after an object undergoes a physical transformation)
- Procedure:
  - Pre-test → Instruction → Post-test
- Instruction conditions:
  - Speech alone; no objects
  - Speech alone; objects present
  - Gesture + speech; no objects
  - Gesture + speech; objects present



# Do some listeners benefit more from gesture than others?

- Instruction conditions:
  - Speech alone; no objects
  - Speech alone; objects present
  - Gesture + speech; no objects
  - Gesture + speech; objects present
- Results:
  - Children **improved more** with gesture + speech instruction when objects were absent



# Do some listeners benefit more from gesture than others?

- Children listeners appear to benefit more from gesture than adults or teens
  - Perhaps gestures help children represent ideas that they can not yet express verbally

# Does observing gesture benefit a listener's comprehension, memory, and learning?

- Gestures have been shown to...
  - have immediate effects on comprehension
  - improve memory of a concept over time
  - improve conceptual understanding of a topic

# Does observing gesture benefit a listener's comprehension, memory, and learning?

- Tested people on mathematical equivalence problems
  - Mathematical transfer problems:  $(4+5+3 = \underline{\hspace{1cm}} + 7)$

**Procedure:** pre-test → training → post-tests

- Pretest:  $(4+5+3 = \underline{\hspace{1cm}} + 3)$
- Training videos
  - Verbal explanation of strategy to solve problem
  - Conditions: Gesture vs No Gesture
- Post-tests
  - Immediately after training
  - 24 hours later

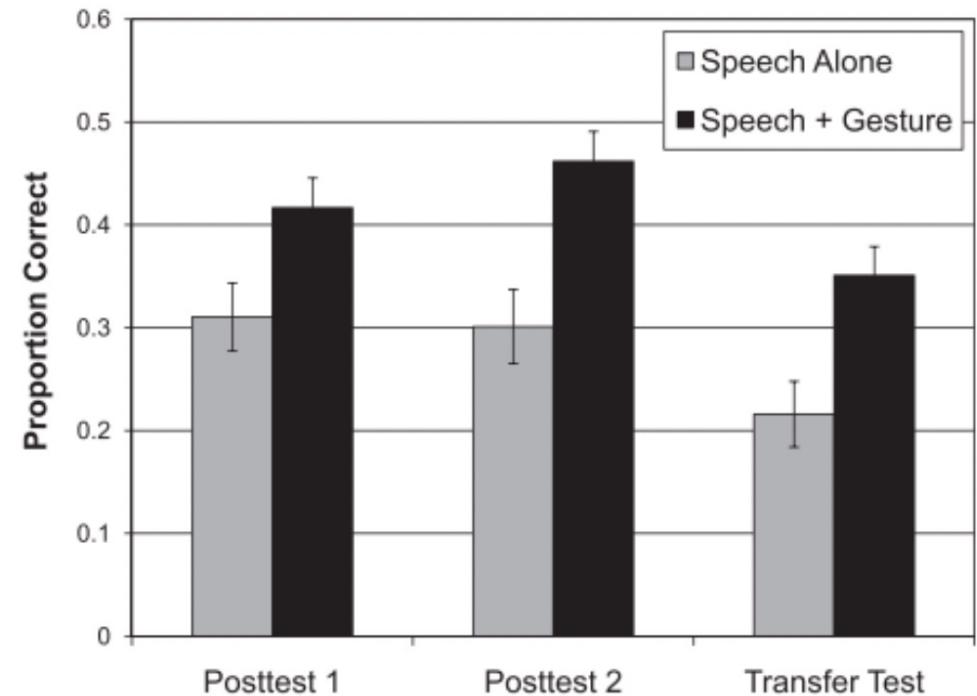


Figure 1. Average proportion correct for the speech-alone and speech and gesture groups on Posttest I, Posttest II, and the transfer test. Error bars represent SEM.

# Gesture & Education

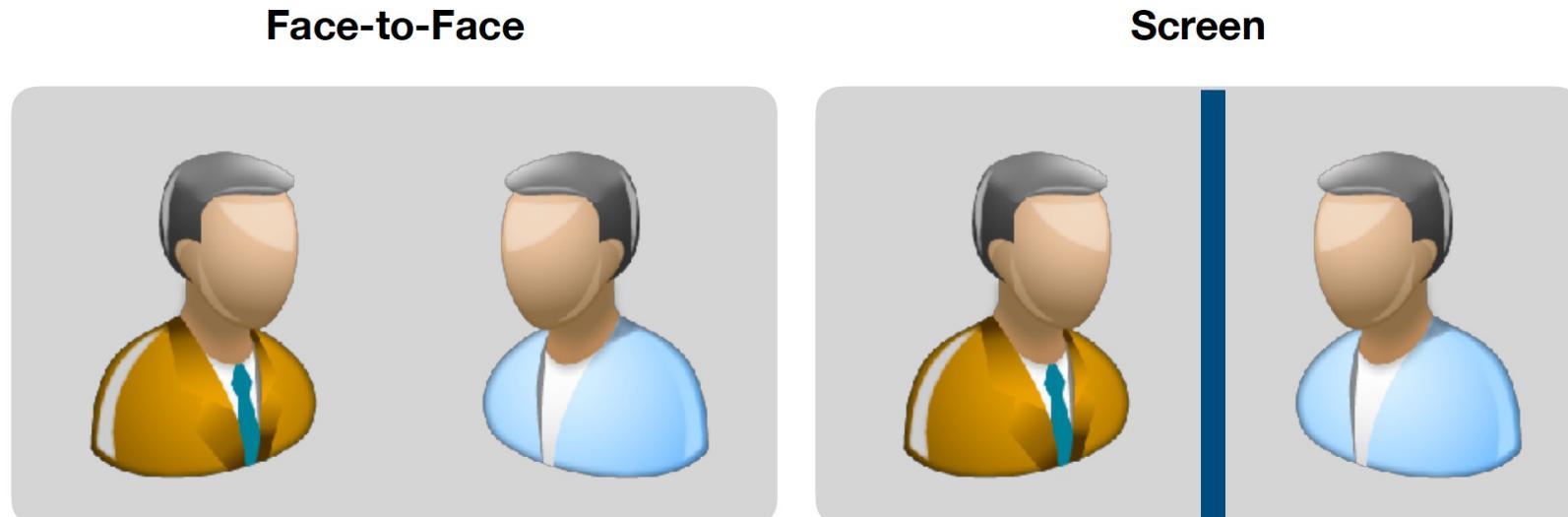
- Gesture as a tool for teaching (k-12 and college level)
  - Mathematics (Alibali & Nathan, 2011)
  - Biology (Pozzer-Ardenghi & Roth, 2006)
  - Chemistry (Flood et al., 2014)
  - Second language learning (Smotrova & Lantolf, 2013)
- Gesture can be used as a tool for understanding where children are having difficulty, or revealing when they are ready to make conceptual advances (Alibali & Goldin-Meadow, 1993)
  - Children who learned to correctly solve equivalence problems often followed this order:
    - 1. Solved the problem incorrectly
    - 2. Entered “*a discordant state*” in which they proposed different solutions: one in speech and another in gesture
    - 3. Correctly solve the problem
  - There’s a transitional state in understanding, and “gesture can be a powerful source of insight into the processes involved in cognitive development”

# Why do we gesture?

- Do we gesture for others, or for ourselves?

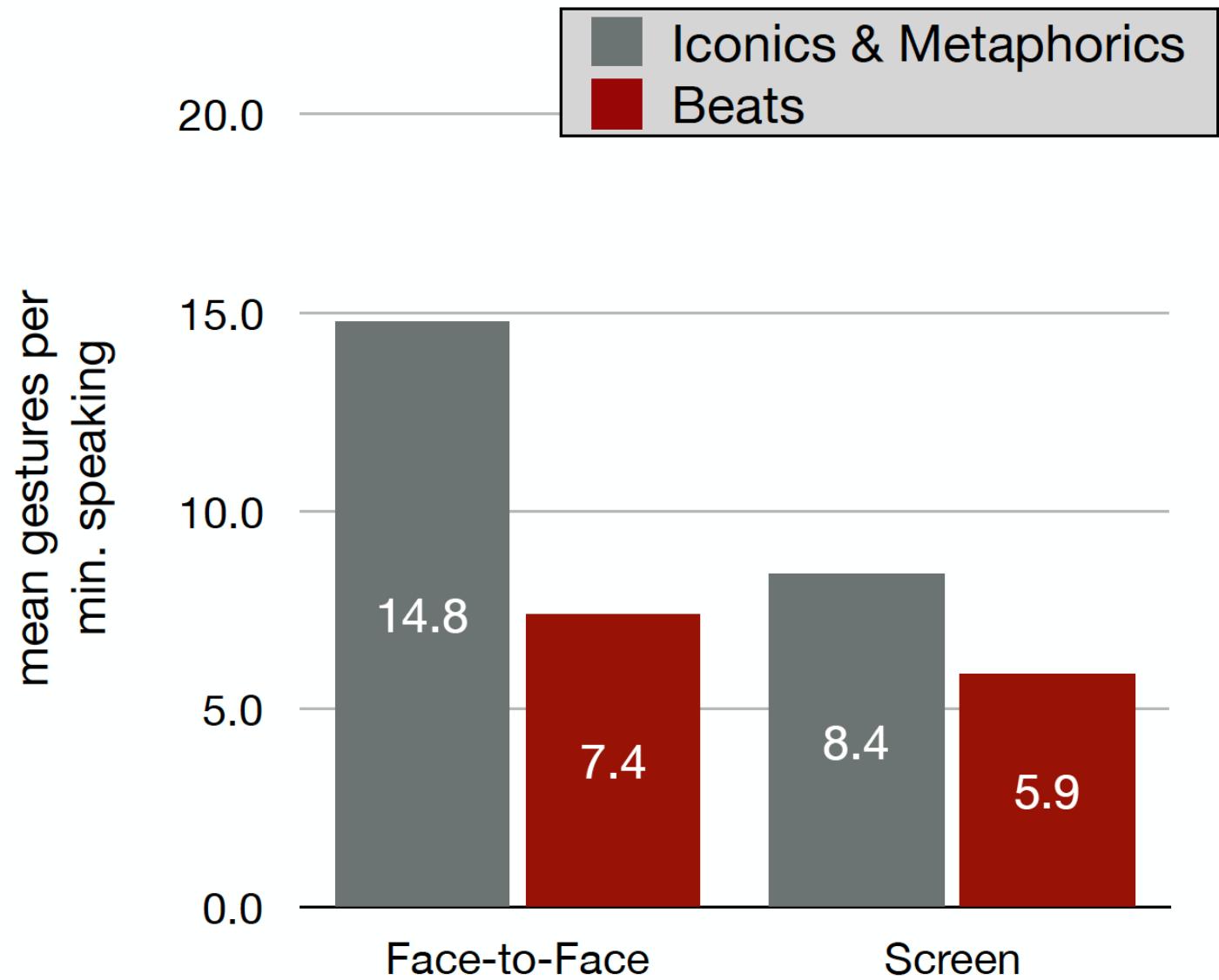
# Why do we gesture?

- Do we gesture for others, or for ourselves?
- **Research question:** Do people gesture more when their listeners stand to benefit from those gestures?
- **Procedure:** Participants watched and re-told parts of a Tweety Bird & Sylvester the Cat cartoon in two conditions



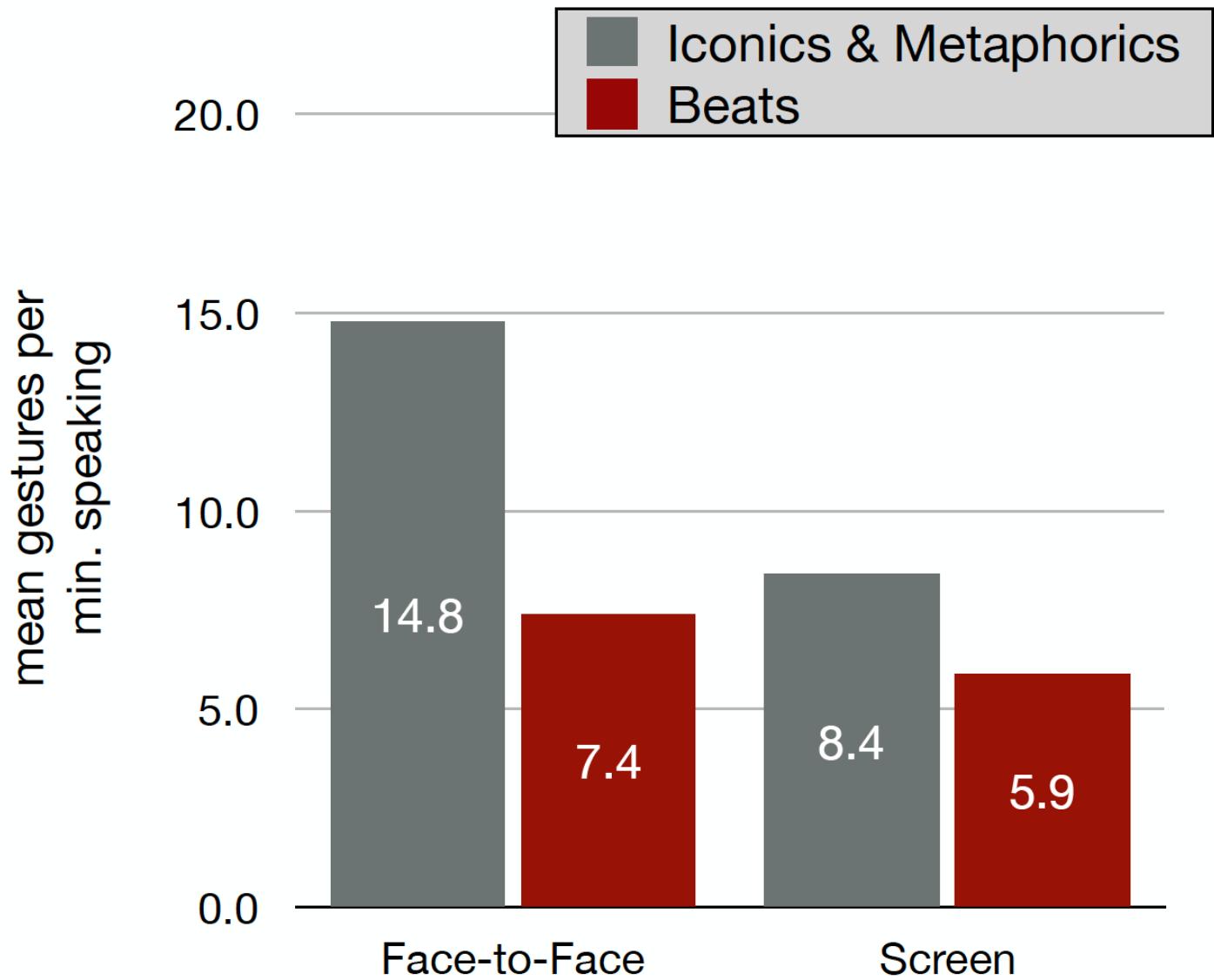
# Results

- People produced fewer gestures when their listeners could not see them
  - but, this was only the case for iconics and metaphorics!
  - beat gestures did not decrease significantly when they knew their listener couldn't see



# Conclusions

- People gesture for others!
  - They don't gesture as much when others can't see those gestures.
- ... But people also gesture for themselves!
  - They don't stop gesturing altogether when others can't see those gestures.



# Gesture & the Legal World

Consider two transcripts:

Interviewer: “What was he wearing?”

Child: “A hat”

vs

Interviewer: “What was he wearing?”

Child: [silence]

Interviewer: “Was he wearing glasses?”

# Gesture & the Legal World

Now consider these transcripts:

Interviewer: “What was he wearing?” *[speaker makes a hat gesture]*

Child: “A hat”

vs

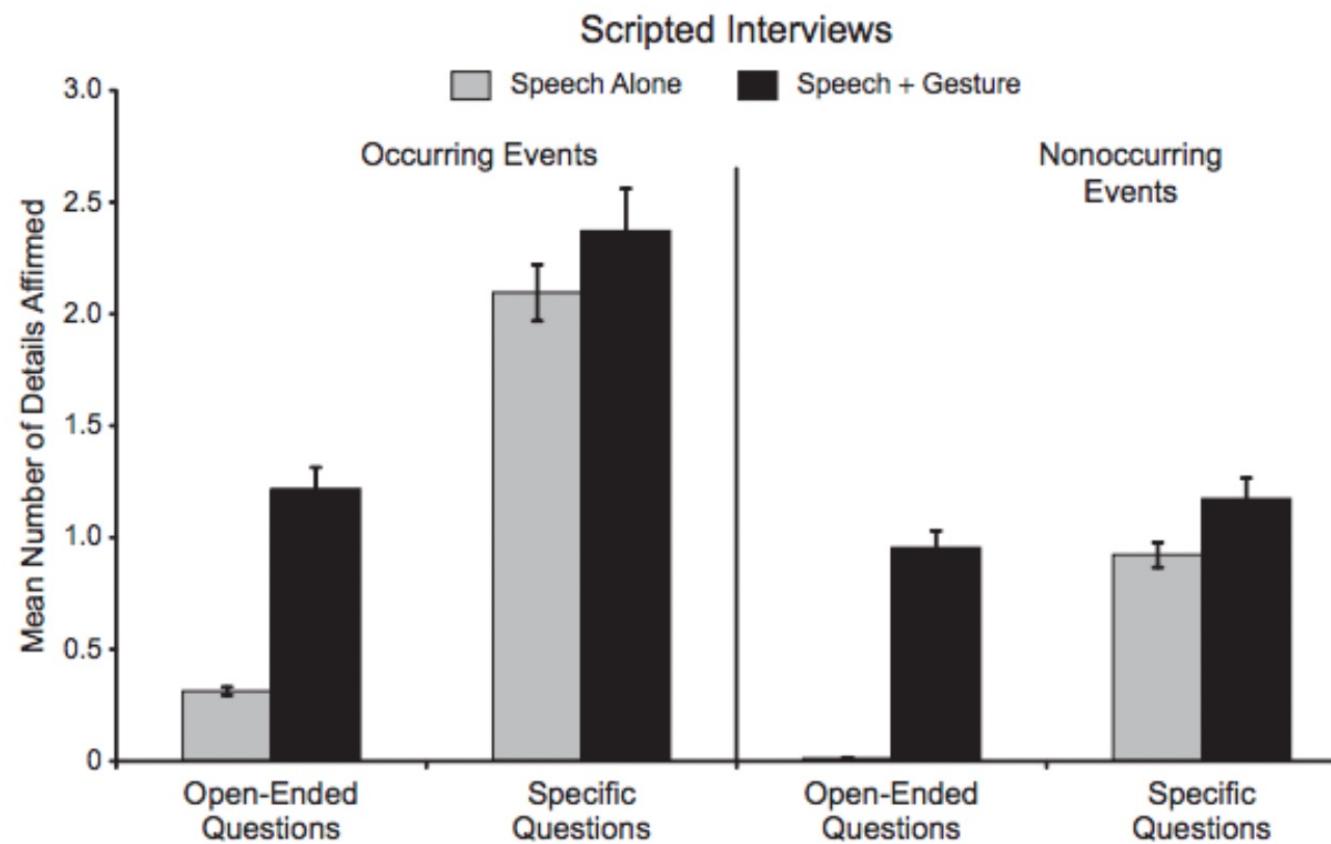
Interviewer: “What was he wearing?”

Child: *[silent, but makes two circle gestures around his eyes]*

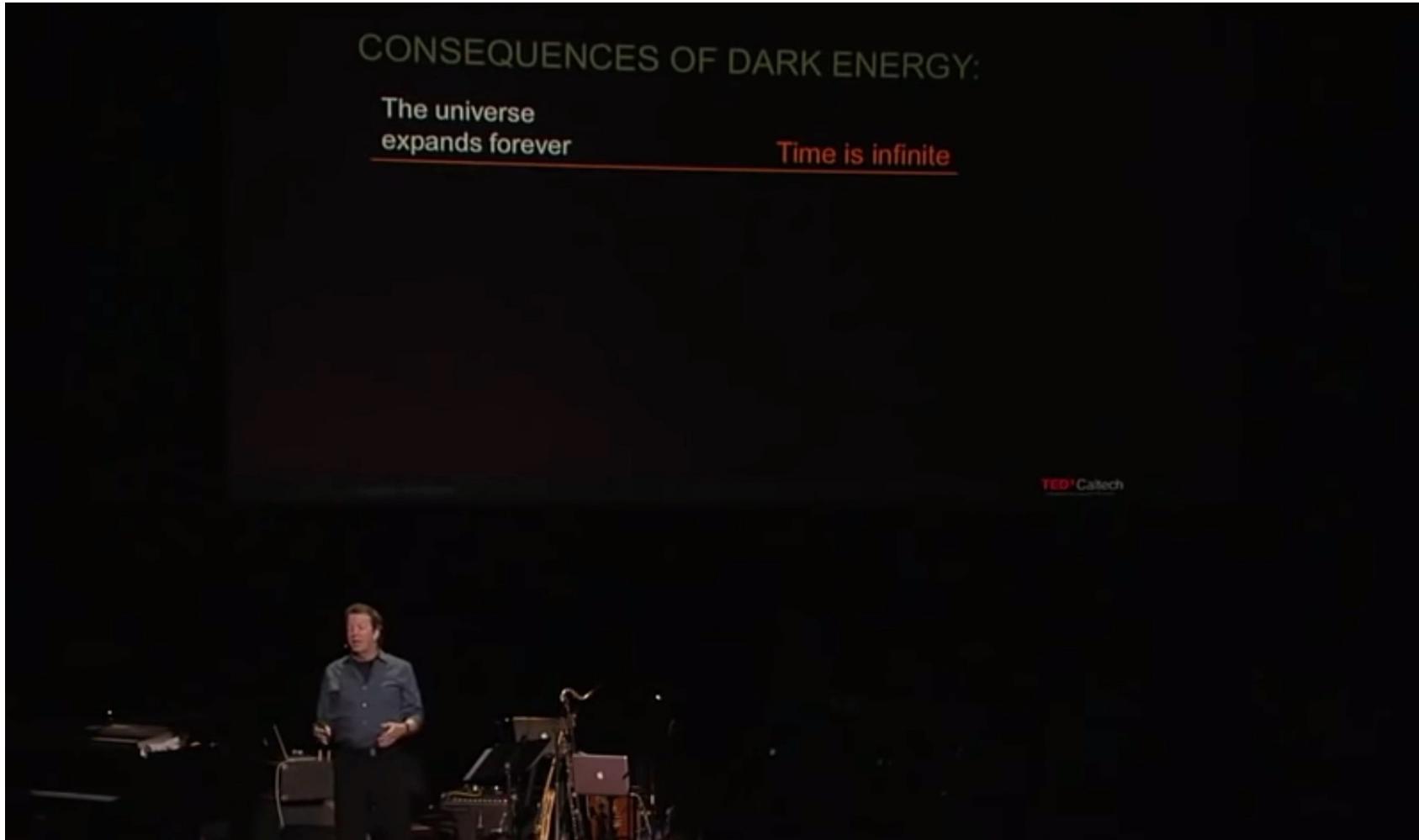
Interviewer: “Was he wearing glasses?”

# Gesture & the Legal World

- The way in which investigative interview questions are framed influences witness reports
  - See Loftus (2005) for a review
- Can the gestures that witnesses observe during interviews influence their responses?
  - Yes!
  - Remember that gestures can convey information that is *not present* in speech



# Where is the past and where is the future?



<https://youtu.be/Y350oOiunf4?t=434>

7:14-7:23

# Where is the past and where is the future?



“The universe is going to keep expanding forever and ever and ever, 14 billion years in the past (gestures behind himself) ... and an infinite number of years into the future (gestures ahead of himself)”

Incredibly abstract concepts!

# Time & spatial metaphors



co-speech gesture



sign language

# In Aymara: the past is in front & the future is behind



(1) *nayra mara* (“last year”)

literal gloss:

<i>nayra</i>	<i>mara</i>
eye/sight/front	year

(2) *ancha nayra pachana* (“a long time ago”)

literal gloss:

<i>ancha</i>	<i>nayra</i>	<i>pacha</i>	<i>-na</i>
a lot	eye/sight/front	time	in/on/at

(3) *nayra pacha/timpu* (“past time”)

literal gloss:

<i>nayra</i>	<i>pacha/timpu*</i>
eye/sight/front	time

\**Timpu* is borrowed from the Spanish word for time, *tiempo*.

(4) *qhipüru* (“a future day”)

literal gloss:

<i>qhipa</i>	<i>uru</i>
back/behind	day

(5) *akata qhiparu* (“from now on”)

literal gloss:

<i>aka</i>	<i>-ta</i>	<i>qhipa</i>	<i>-ru</i>
this	from	back/behind	to, towards

(6) *qhipa marana* (“in the next [immediately future] year”)

literal gloss:

<i>qhipa</i>	<i>mara</i>	<i>-na</i>
back/behind	year	in/on/at

(7) *qhipa pacha/timpu* (“future time”)

literal gloss:

<i>qhipa</i>	<i>pacha/timpu*</i>
back/behind	time

\**Timpu* is borrowed from the Spanish word for time, *tiempo*.



01:13:11

(a)



01:13:14

(b)



01:13:17

(c)

Fig. 9. Example of frontward index-finger pointing gesture coproduced with the phrase *es la otra generación* ("is the other generation"), meaning distant ancestral generations.

Gestures can demonstrate differing cognitive models

- English and Aymara show different cognitive models for time
    - English speakers and Aymara speakers both use spatial metaphors for time
    - Aymara speakers use past-ahead / future-behind metaphors
    - The way we gesture reveals the way we *conceptualize* time

## **Which Way Is Tomorrow?**

Spatial metaphors for past and future vary around the world.

# On speech & metaphoric gestures

1. Metaphor can appear in speech without accompanying gestures
2. Metaphor can appear in gestures without accompanying metaphorically used words
  - Speaker points to himself, saying “I had trouble grasping his theory.” Gesture relates to the utterance, but not to the metaphor UNDERSTANDING IS GRASPING
3. The ‘same’ metaphor can appear in words and gestures in an utterance (Mueller, 2004)
4. *Different metaphors* can be expressed simultaneously in words and gestures (Cienki 1998, 2008a)
  - “The world isn’t just black and white, it’s shades of gray” with a gesture to the left and right with hands
    - Color metaphor in speech and a spatial metaphor in gesture

# Some takeaway points

- Gestures are movements made during communication, produced along with utterances (or used alone as utterances)
- There are 5 types of gestures: iconic, metaphoric, deictic, emblematic, and beat/emphatic
- Gestures are integrated with speech in timing and meaning, but do not merely duplicate speech
- Gestures vary across cultures because of different conventions, different cognitive models, and different linguistic resources
- People gesture for others (i.e., for communicative reasons) and for themselves (i.e., for cognitive reasons)
- Studying gestures provides us a window “into the mind”