Lecture 3: Language acquisition 1 - early prerequisites

Cognition and Communication, Monday, Sep. 13th 2021

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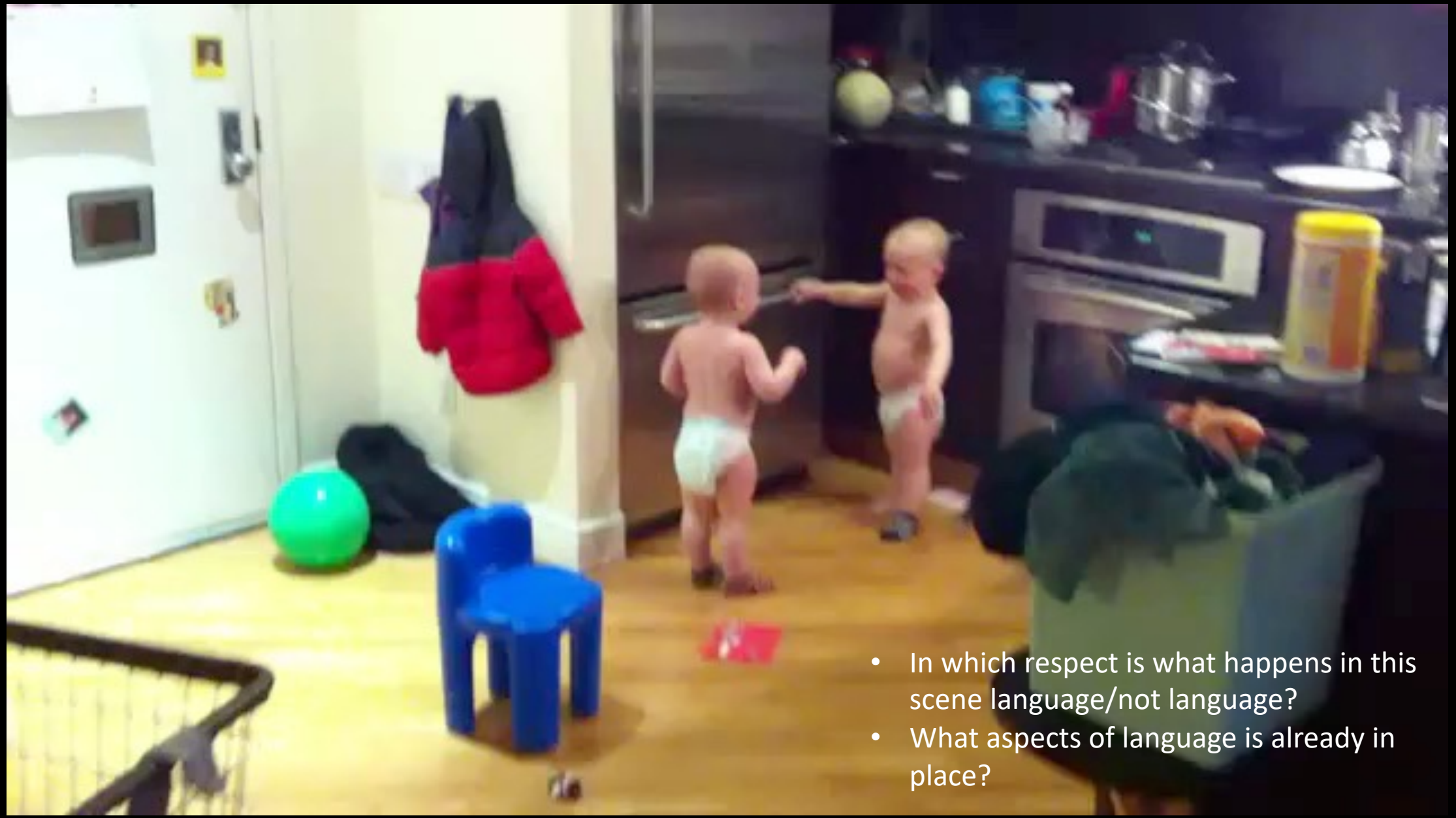
Agenda

- Warm-up: exploring the “boundaries of language”
- Recap of the special human capacities for communication
- Early prerequisites of language acquisition:
  - Imitation
  - Dyadic interaction and contingencies
- Triadic interaction:
  - Gaze following and natural pedagogy
  - The joint attentional scene
  - Theory of mind
- Child directed speech



- In which respect is what happens in this scene language/not language?
- What aspects of language is already in place?

Imitation

- Neonatal imitation:
  - from few hours old up to c. 20 days, newborn infants spontaneously imitate some facial expressions
  - Continuous/discontinuous with later imitation behavior?

- Also observed in chimp babies (Myowa, 1996)

Meltzoff & Moore (1977). Science

Imitation

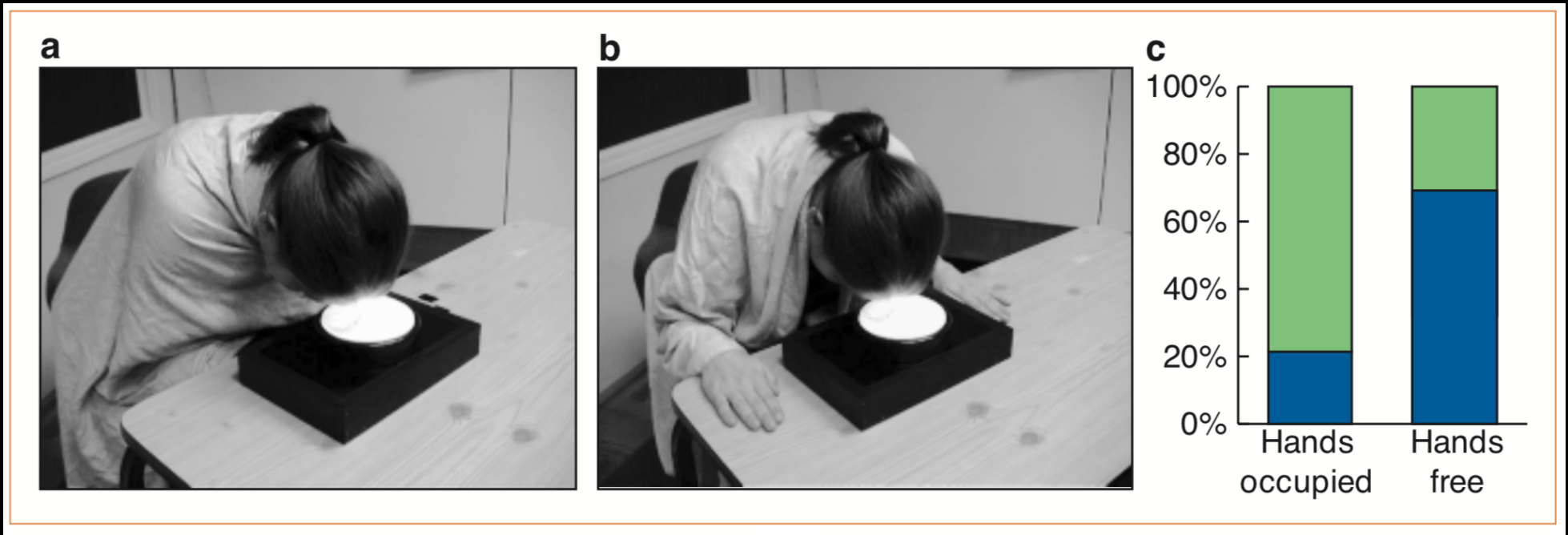
- Around eight months:
  - intentional imitation: e.g. peek-a-boo, familiar gestures, such as clapping hands together or patting a doll's back.
- At around 18 months:
  - Pretense play: infants engage in games such as taking in a toy phone, pretending to sweep with a child-sized broom, as well as drinking from a toy cup
- Imitation is an important learning mechanism:
  - A way for children to acquire cultural knowledge and routines
  - Children imitate more than chimps/other primates

Imitation

- Overimitation:
  - The imitation of apparently superflous acts
  - Only observed in humans (chimps *emulate* – that is, they go for the resulting stage without copying all the intermediate stages)

Is overimitation rational?

- The mechanisms: How automatic/intentional is infant imitation?

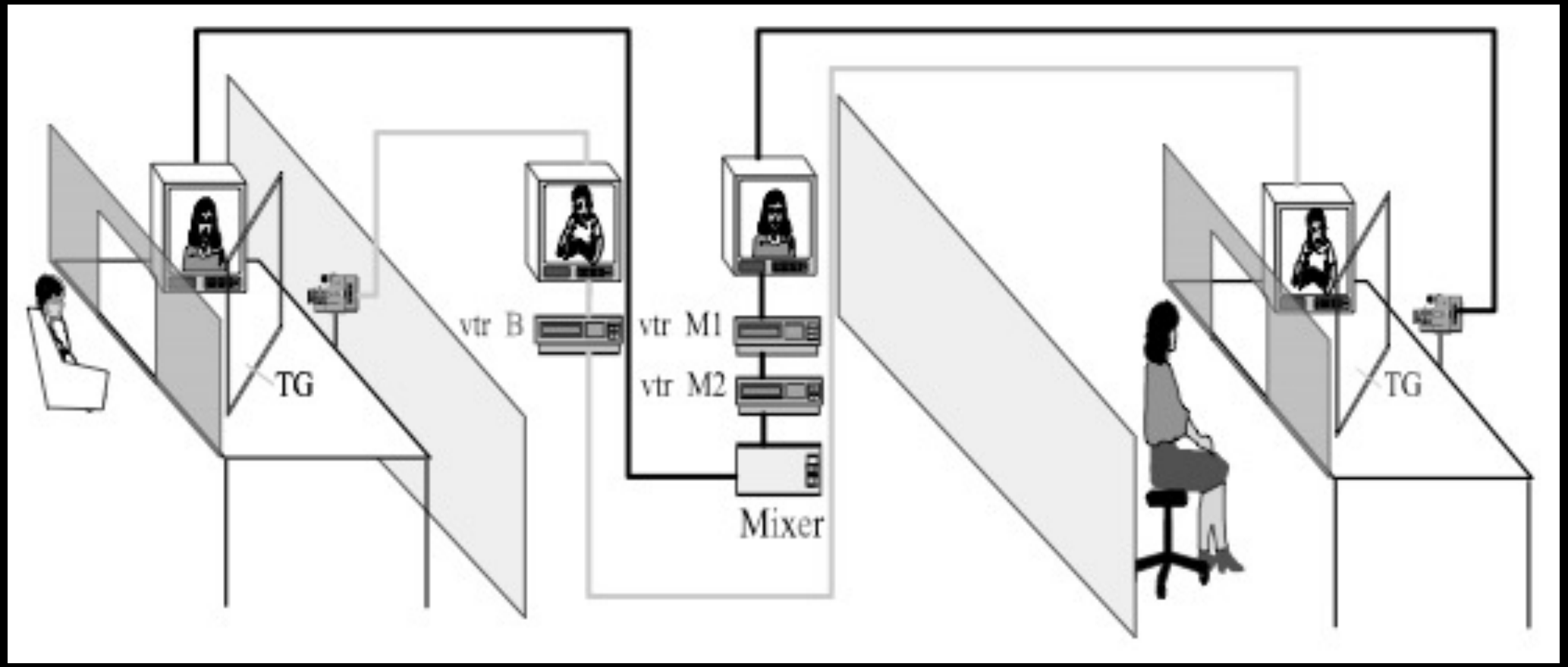


- Gergely et al (2002). Rational Imitation in Preverbal Infants, *Nature:*
  "Our results indicate that imitation of goal-directed action by preverbal infants is a selective, interpretative process, rather than a simple re-enactment of the means used by a demonstrator, as was previously thought" (2002:755)

Prerequisites to acquire the arbitrary practices of human culture …?

Social contingency

Nadel et al (1999). Expectancies for social contingency in 2-month-olds

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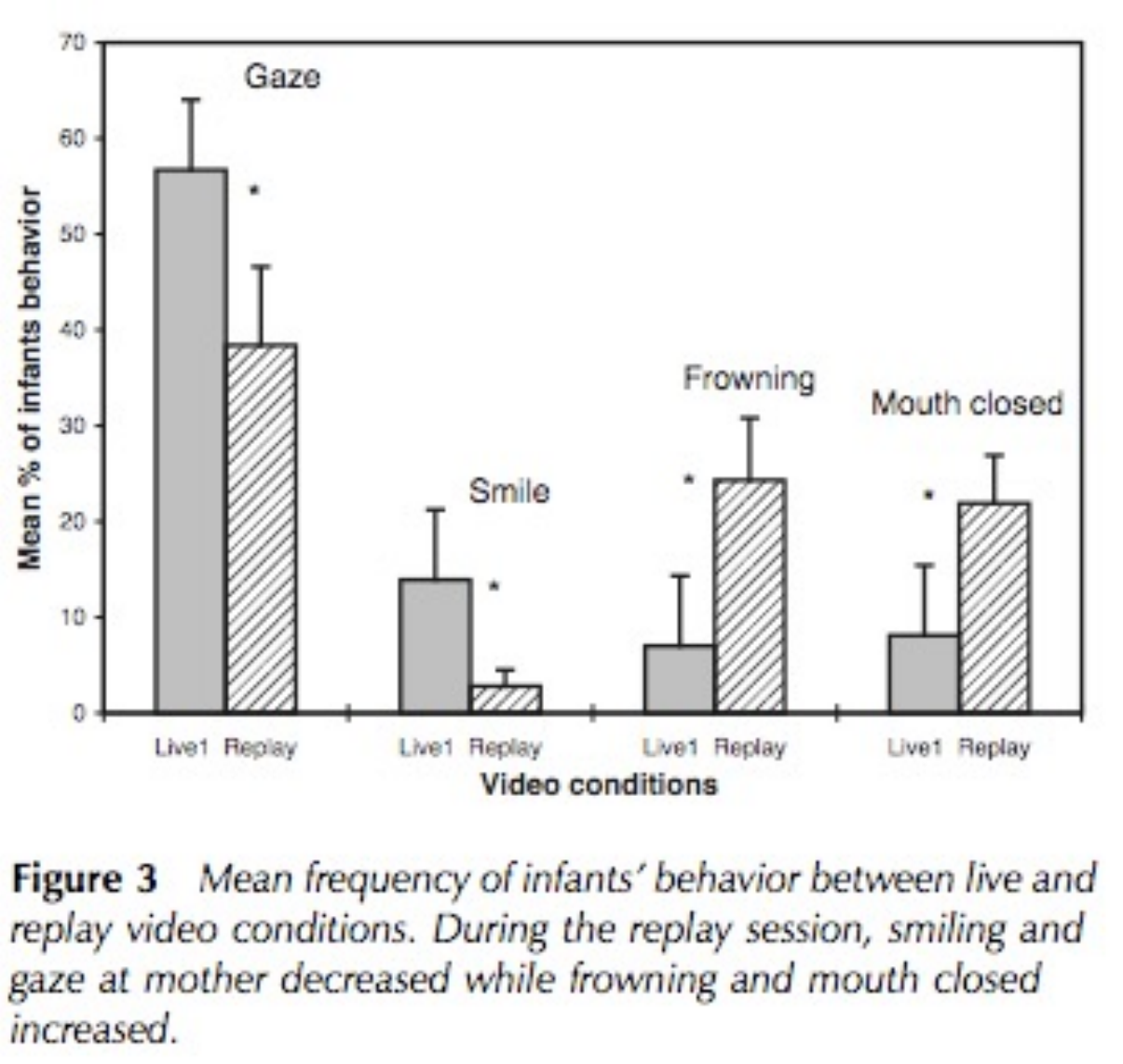
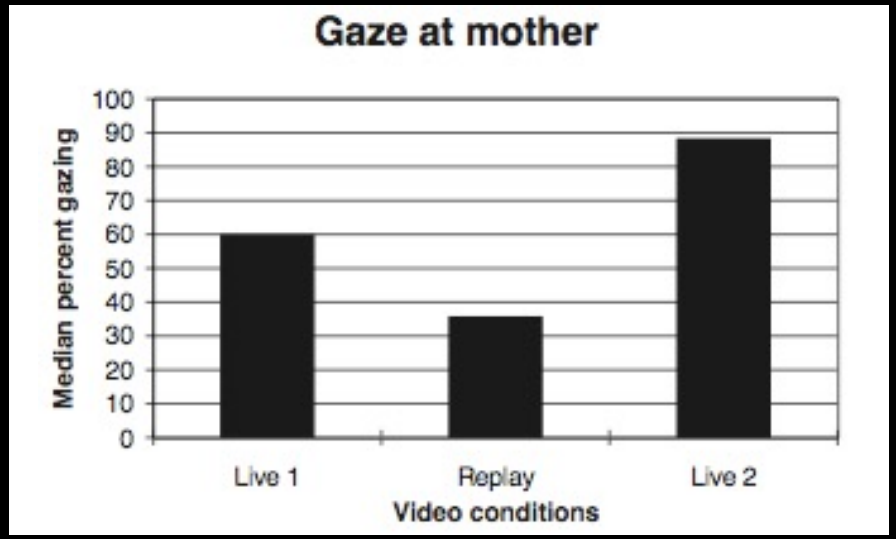
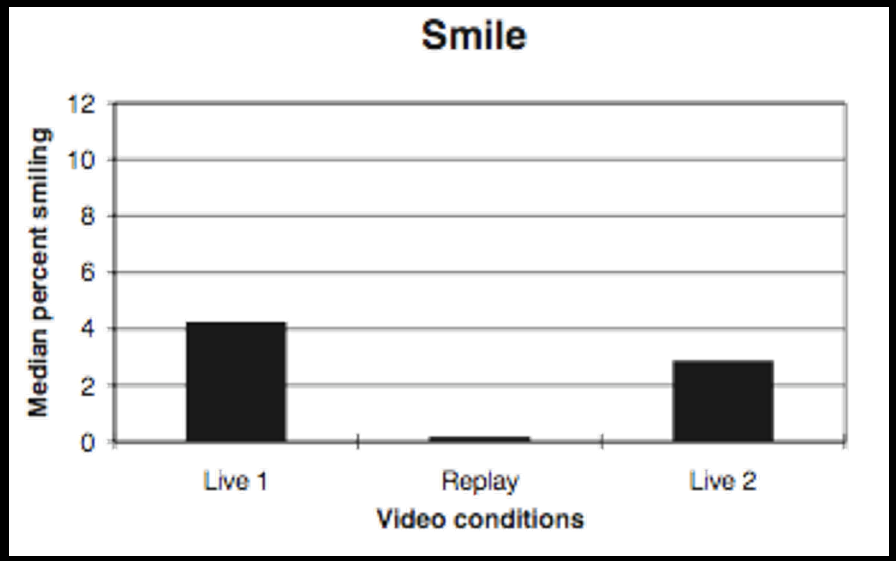


Figure 3 *Mean frequency of infants' behavior between live and replay video conditions. During the replay session, smiling and gaze at mother decreased while frowning and mouth closed increased.*





- "Our results show that very young infants are highly sensitive to social contingency and also expect adults to produce socially contingent responses during face-to-face interactions". (1999:172)

Joint attention

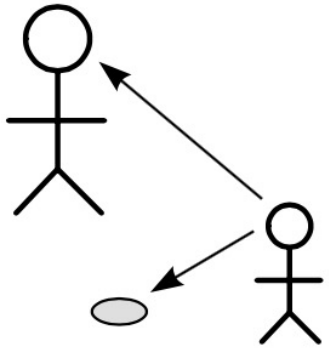
- From dyadic to triadic interaction:
  - “Six-month-old infants interact dyadically with objects, grasping and manipulating them, and they interact dyadically with other people, expressing emotions back and forth in a turn-taking sequence …
  - … If people are around when they are manipulating objects, they mostly ignore them. If objects are around when they are interacting with people, they mostly ignore them.” (Tomasello 1999: 62)

- “Triadic” Interactions incorporate …
  - The infant
  - The adult
  - An object or element of shared attention

- Tomasello suggests these behaviors are initiated around 9 month

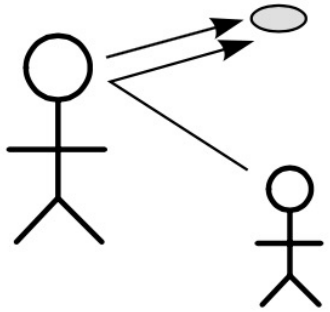
The joint attentional scene

Check attention (9–12 months)



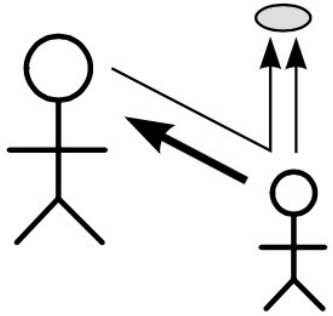
Joint engagement
Social obstacle
Show object

Follow attention (11–14 months)



Gaze/point follow
Imitative learning
[Social referencing]

Direct attention (13–15 months)



Imperative pointing
Declarative pointing
[Referential language]

- The joint attentional scene: the cooperative social context in which children acquire awareness of social attention, self and other
- And eventually realize that they can manipulate the attention of adults

Theory of Mind

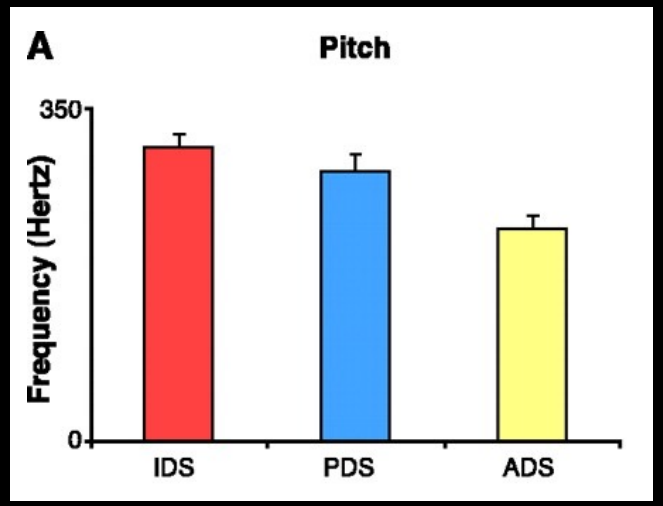
- The conscious awareness that other individuals have a mind – and mental states (e.g. beliefs) different from myself
- The false belief test:
  - Will the child keep track of own and others' beliefs about the world?
- Children will usually pass the test from age 4
- But … might display implicit understanding from the age of 15 month (tested with eye tracking)

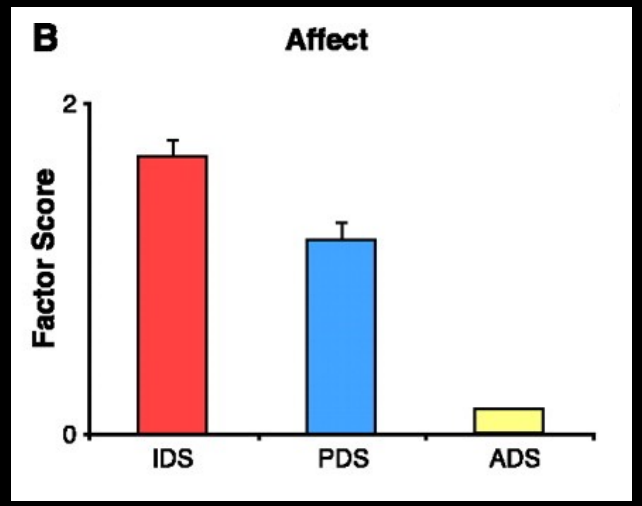
Child directed speech

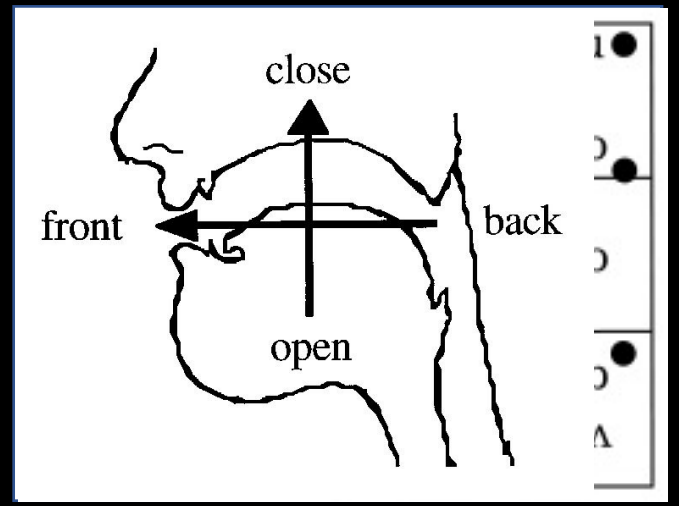
Child directed speech

- Caregivers scaffold infants early language acquisition by …
  - Talking slower
  - Simpler and shorter sentences
  - Exaggerate pronunciation
  - Weird (but engaging) prosody

- Burnham et al (2002) compared how we speak to adults, pets and infants:







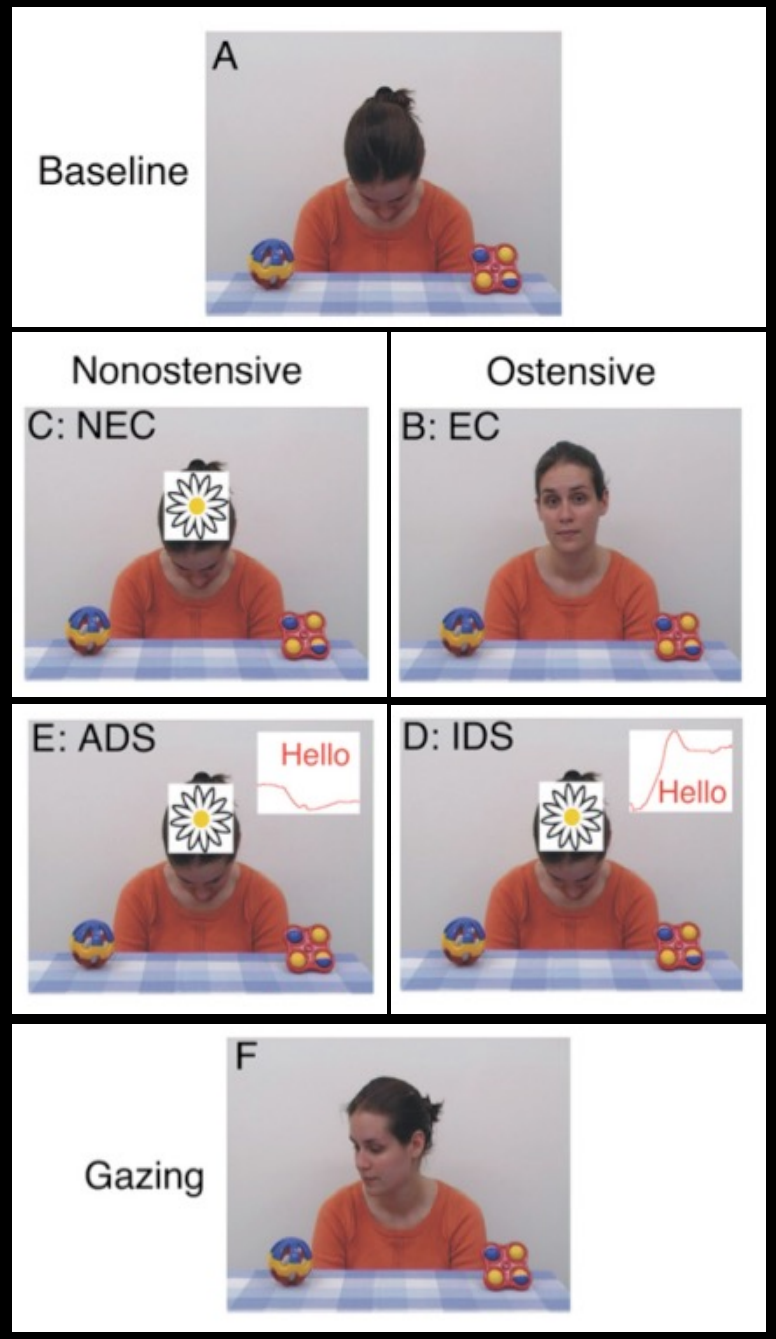
Burnham et al. Science 2002;296:1435

Csibra and Gergely (2009): Ostensive cues and “Natural Pedagogy”

- Humans come evolutionarily prepared to transfer and learn relevant cultural knowledge.
- We are equipped with an innate social learning system called ‘natural pedagogy’ (Csibra & Gergely, 2006)
- From birth, infants show a high sensitivity to a specific kind of communicative cue – *ostensive cues*:
  - eye-contact, contingent responsivity, child -directed speech / ‘motherese’
- These cues signal the “teacher’s” communicative intention to manifest new and relevant knowledge about the world
- In triadic ostensive contexts, the infant learns about generic properties of the world (rather than just local information that obtain only in the ‘here-and-now’)

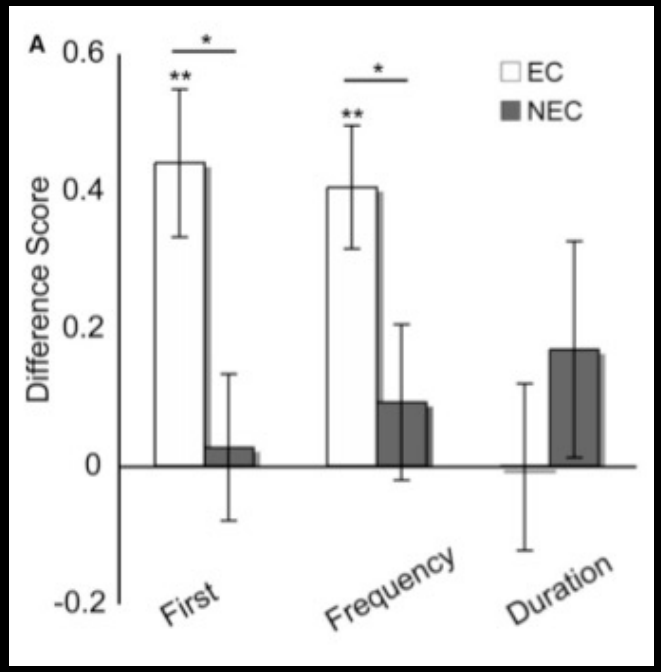
Senju & Csibra (2008). Gaze following in human infants depends on communicative signals

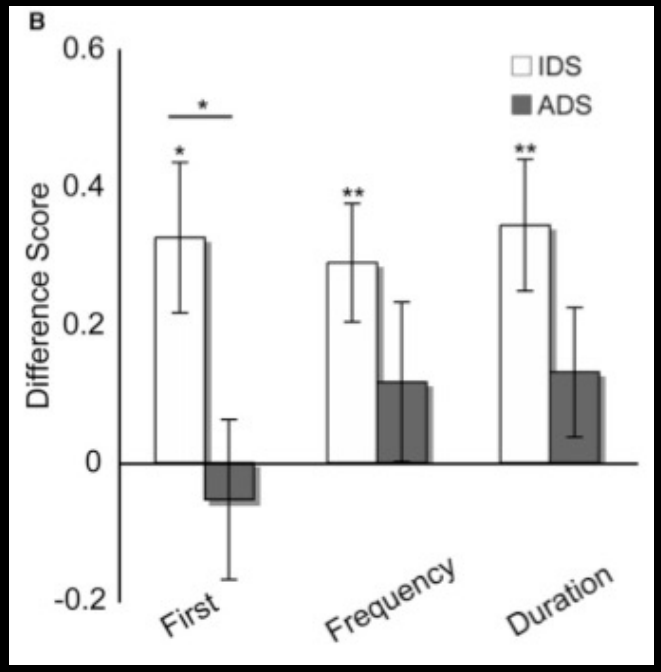
- Six month old infants sat in front of a video monitor
- Exp 1:
  - NEC (no eye contact)
  - EC (eye contact)
- Exp 2:
  - ADS (adult directed speech)
  - IDS (infant directed speech)
- Eye tracker tracked the infants gaze direction, saccades and fixations



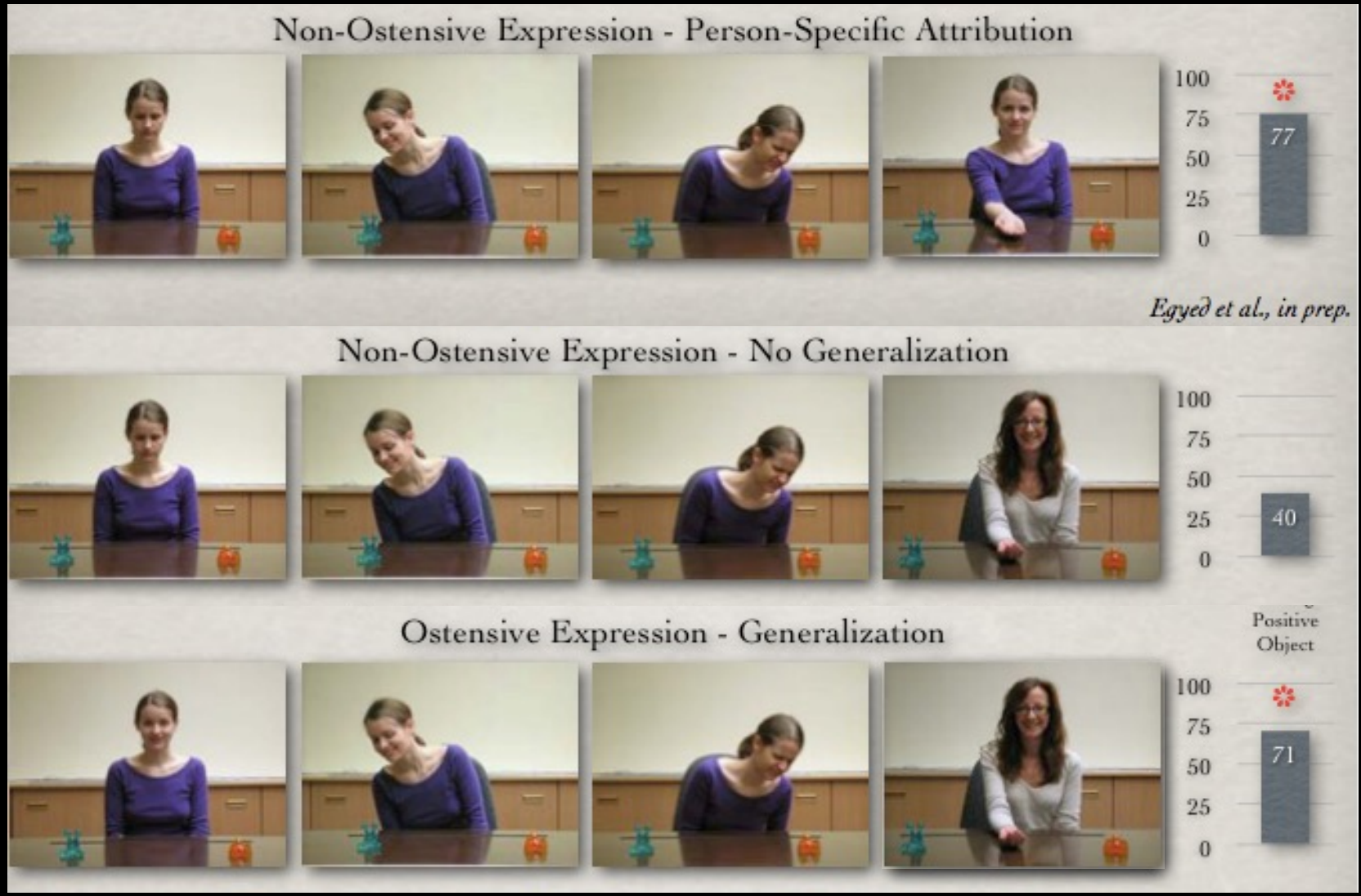
Results

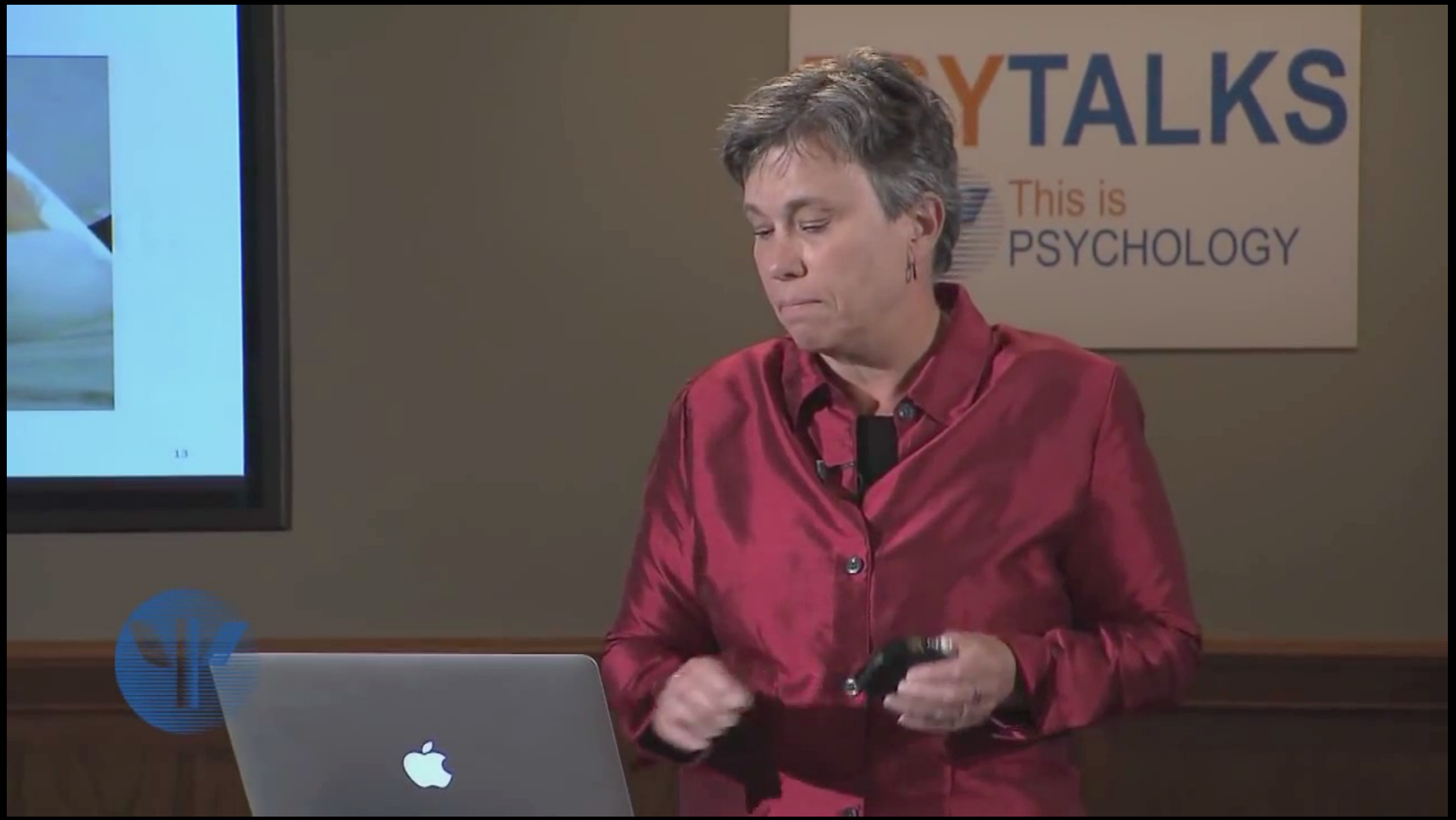
- “We found that 6-month-old infants followed the adult’s gaze (…) toward an object only when such an act is preceded by ostensive cues such as direct gaze (experiment 1) and infant-directed speech (experiment 2)…
- Such a link between the presence of ostensive signals and gaze following suggests that this behavior serves a functional role in assisting infants to effectively respond to referential communication directed to them.” (2008:668)





Sensitivity to ostensive cues (Egyed et al 2013)





Yu, C., & Smith, L. B. (2012). Embodied attention and word learning by toddlers. *Cognition*, *125*(2), 244-262.

Structuring the infant world

- Adult caregivers use ostensive cues to establish joint attention to objects
- But they also often help the child reduce the perceptual complexity of the world for the sake of word learning
- By reducing the number of competitor referents for a word, the adult scaffolds word learning

Take home

- Infants seem to be born for collaborative interaction:
  - They imitate
    - Even over-imitate?
    - … but in a ‘rational’ fashion?
  - They show sensitivity to social contingency
    - … and engage in proto-conversations even before they have words
  - They seem to evolve a Theory of Mind: the awareness that other people have hidden mental states
    - Which means that these states (e.g. attention, beliefs, intentions) can be manipulated
    - Joint (triadic) attention
- Adults play an important role establishing pragmatic prerequisites
  - Structuring the environment
  - Providing ostensive cues
    - informing the child e.g. that now follows an episode of learning about the world
  - Child directed speech