Psychology of Language

13 Dialogue

Fall 2023
Tues/Thur 5:00-6:15pm

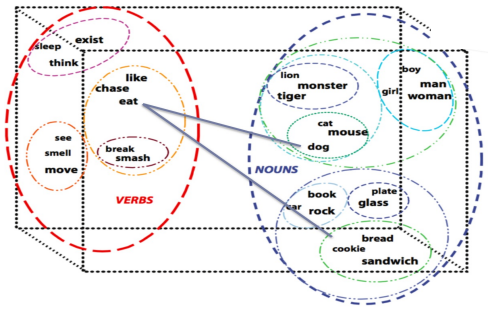
Emma Wing
Drop-in hours:
Wednesdays 3-4pm
& by appointment
Webex link

Road map

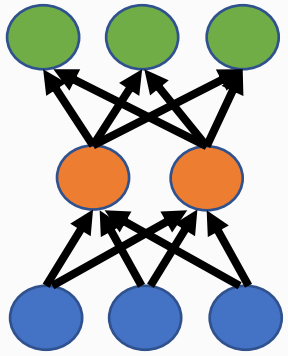
- Assignment #2 is posted, due October 30th @ midnight
  - Reminder: 1 late assignment accepted; 1 redo accepted (/3 total)
- Quiz Reminder: need to complete 8 total to get full points
- Review from **11 & 12 Computational models**
- Unit 2: The Mature System

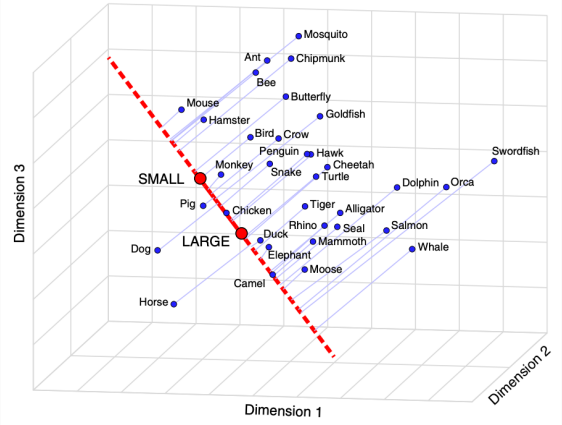
  13 Dialogue

Review from 11 & 12
Computational models

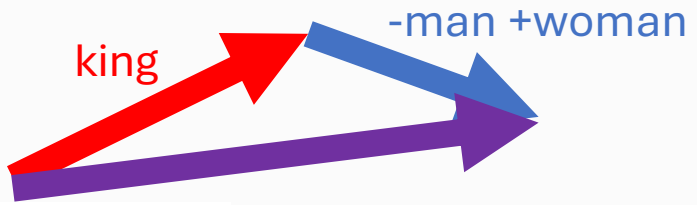


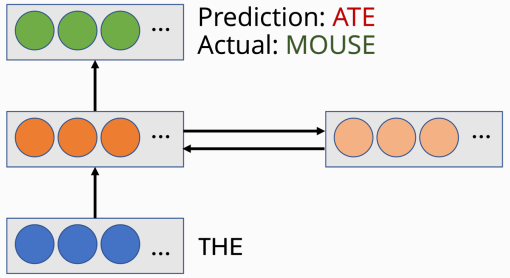
- Key Concepts (chat or think alone)
  - Latent Semantic Analysis (LSA) and global context
  - Word2Vec and local context (2 types discussed!)
  - Simple Recurrent Network, prediction and architecture
  - Semantic spaces
  - Backpropagation
  - Error-driven learning
  - Emergent representation
  - Humans vs. models

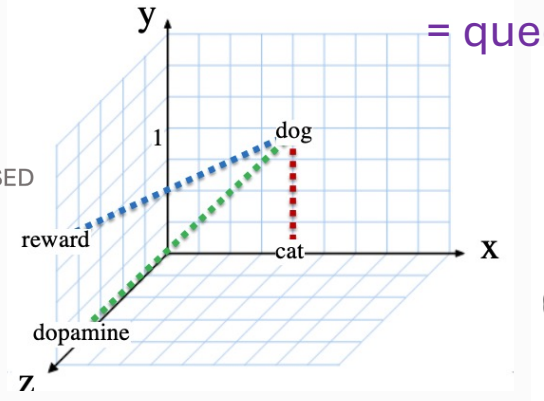


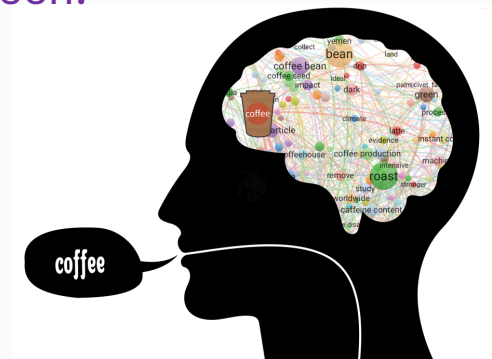


Context (Document)				
	#1	#2	#3	coordinate
CAT	1	0	0	1, 0, 0
DOPAMINE	0	0	1	0, 0, 1
DOG	1	1	0	1, 1, 0
REWARD	0	1	1	0, 1, 1









Unit 2:
The Mature system

13 Dialogue

Learning objectives

- Describe three ways listeners and speakers adjust their assumptions in specific communicative circumstances
- Define common ground and give examples based on a conversation
- Define reliability of the speaker and say how assessing reliability affects a conversation
- Define alinement and give an example of it
- Define audience design and apply it to an example
  - Say which ambiguities speakers avoid and which they tend not to avoid
  - Describe how theory of mind differs between adults and kids

Taking a step back…

- We've talked about how we learn language
- We've talked about what happens when comprehending language, and the processes that support successful comprehension.
- We're going to talk about *dialogue* now, or specific instances of communication between specific speakers (interlocutors)
- Next class, we'll talk about the assumptions we make in conversation more broadly regardless of the speaker
- And in the final lecture in Unit 2, we'll get more specific and look at how we produce speech and the processes underlying language production.

Dialogue

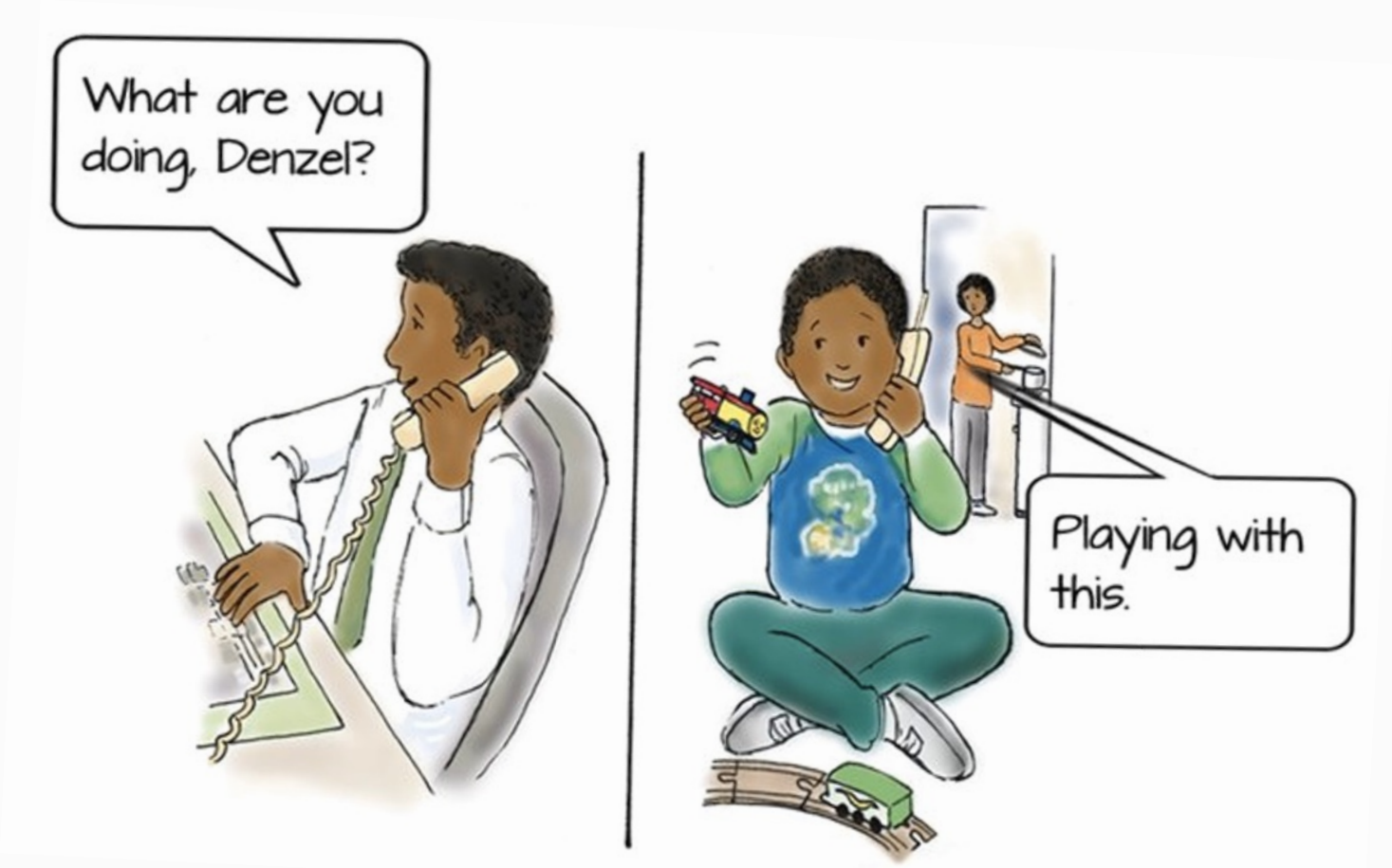
- What sorts of things do we need to do or know in order to communicate successfully in a conversation? (think alone or with others)
  - In general
  - With a friend
  - With a stranger
  - As a professor in a class

"In conversation, [...] hearers and speakers often adopt a mutual, step-by-step responsibility for successful communication."

- Sedivy (2020; 12.4 Dialogue)

What's going wrong here?

Common ground



The child is assuming that his dad knows what “this” is.

Common ground

But the toy isn't in the common ground, so "this" has no referent for the dad.

Common ground

Common ground is information shared by interlocutors

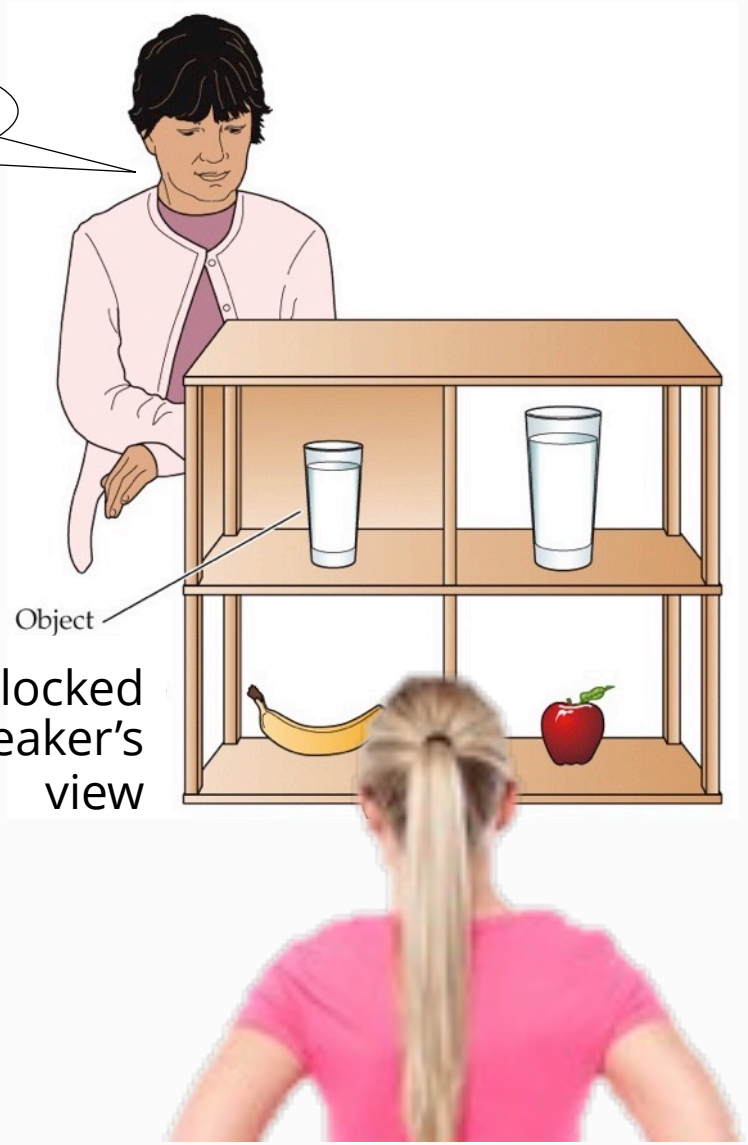
- **Interlocutors** are participants in a conversation

Instruction: “Pick up the glass”.

What do you think the girl in the pink shirt picked up? What’s in the common ground in the experiment?

- Only one of the glasses, the tall glass

- Adults are sensitive to what’s in the common ground

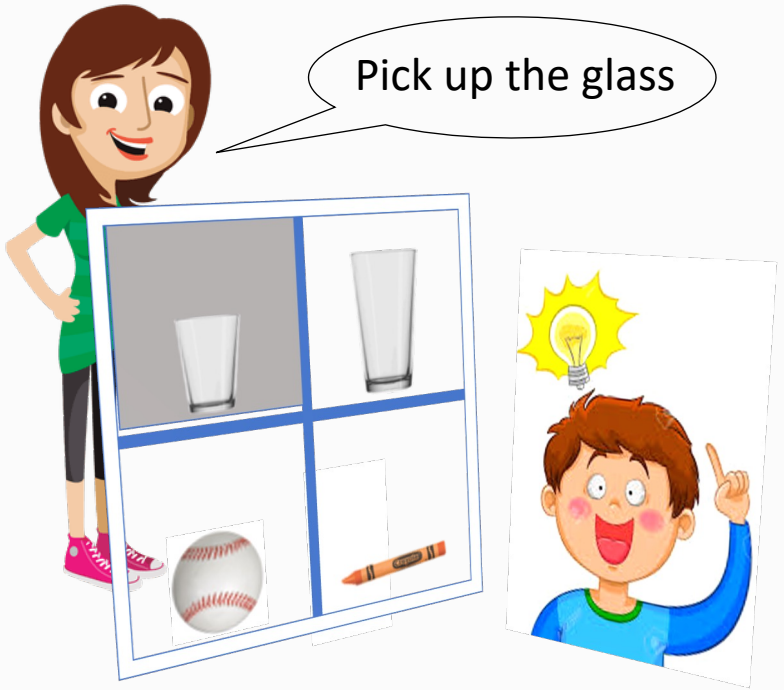


(Hanna et al., 1997)

Common ground (kids)

Common ground in kids

3-4 year olds



5-6 year olds

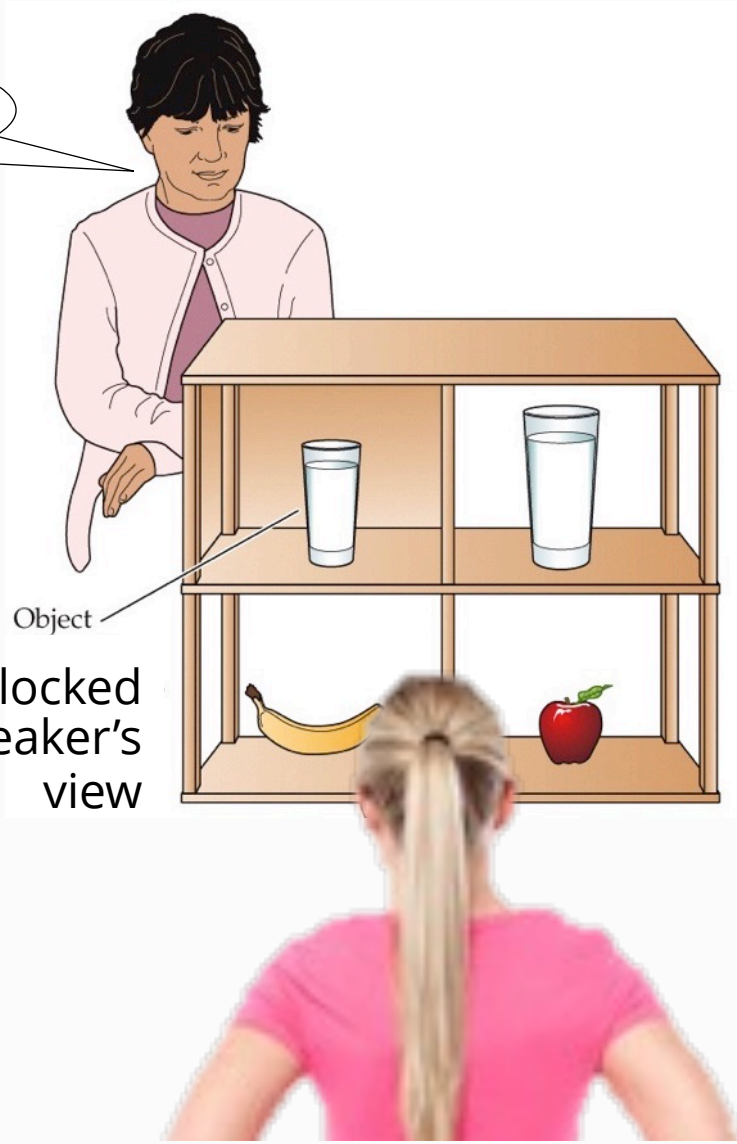
(Nadig & Sedivy (2002)

Common ground

Back to adults…

- What do you think happens when the board behind the small glass is gone and both interlocutors can see both glasses?

Instruction: ”Hand me the glass.”



Object blocked from speaker’s view

(Hanna et al., 1997)

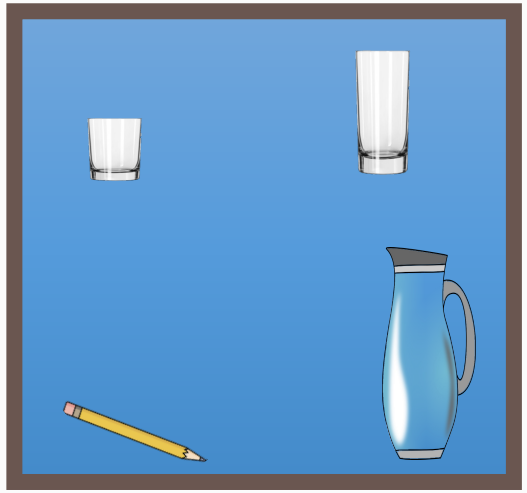
Speaker reliability

What do you think speaker reliability is?
How do you think we act in conversations depending on speaker reliability?

- **Speaker reliability**: whether we think a speaker is competent and trustworthy
- Adults take the reliability of speakers into account when interpreting ambiguous sentences

Evaluating speaker reliability (adults)

A: Pick up the tall glass”



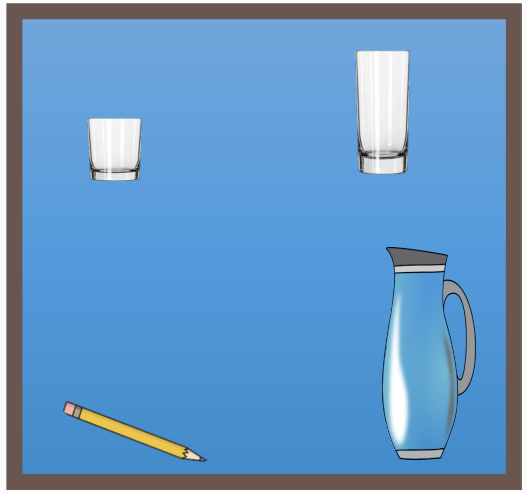
B: “Pick up the tall glass”

- Imagine these objects are in front of you.
- Do you think you’d be faster to pick up the tall glass in condition A or B?
- Why?

Sedivy et al. (1999);
Grodner & Sedivy (2011)

Evaluating speaker reliability (adults)

A: Pick up the tall glass”



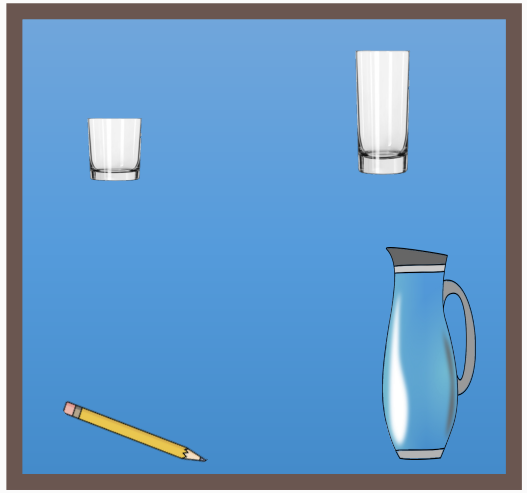
B: “Pick up the tall glass”

- Listeners are faster in left situation (two glasses) than in right (one glass)
- This is because we don’t use modifiers (“tall”) unless they are needed to disambiguate which thing we’re talking about
  - This results in confusion for the comprehender

Sedivy et al. (1999);
Grodner & Sedivy (2011)

Evaluating speaker reliability (adults)

A: Pick up the tall glass”



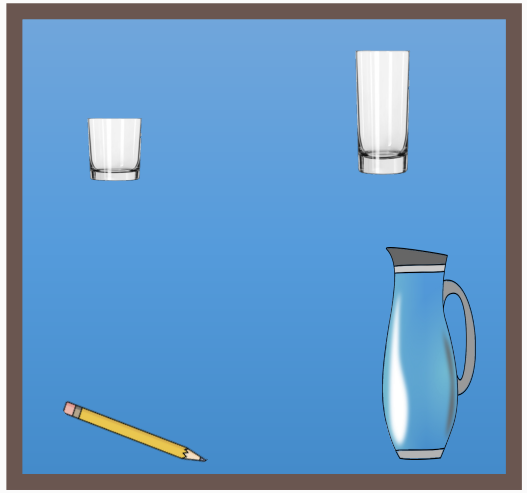
B: “Pick up the tall glass”

- Now imagine you’re told that the speaker is “unreliable”
  - Participants told speaker has an "impairment that causes language and social problems.”
  - Speaker described objects and locations erroneously, e.g., ”stick” for pencil
  - Speaker consistently used overly informative descriptions.
- What do you think happens in this case and why?

Sedivy et al. (1999);
Grodner & Sedivy (2011)

Evaluating speaker reliability (adults)

"Pick up the tall glass"



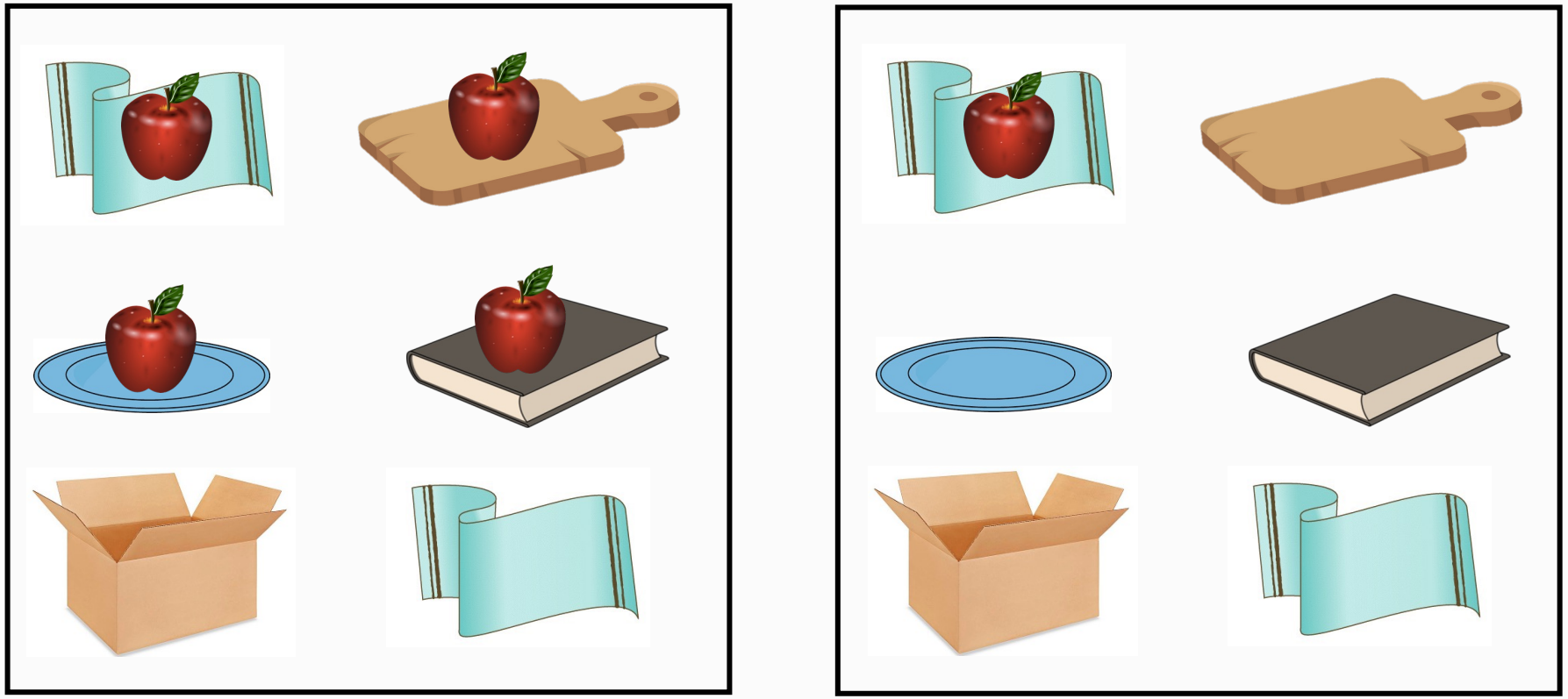
"Pick up the tall glass"

- Expectations about how people typicality behave are decreased
  - We take into account individual speaker knowledge and communication behavior during a conversation
  - In other words, the particular hearer matters

Sedivy et al. (1999); Grodner & Sedivy (2011)

Evaluating speaker reliability (adults)

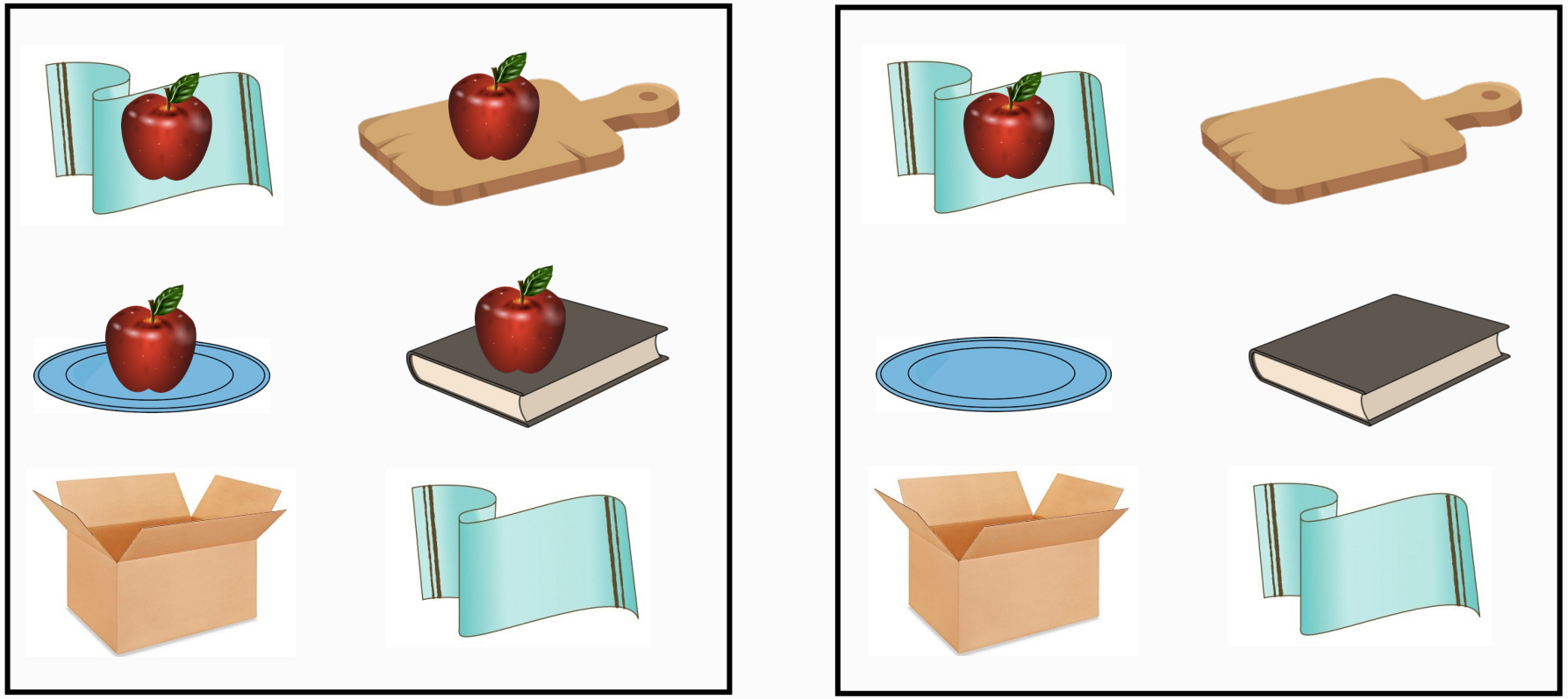
- Remember avoiding the “garden path” (incremental interpretation)?



“Put the apple on the towel in the box.”

Evaluating speaker reliability (adults)

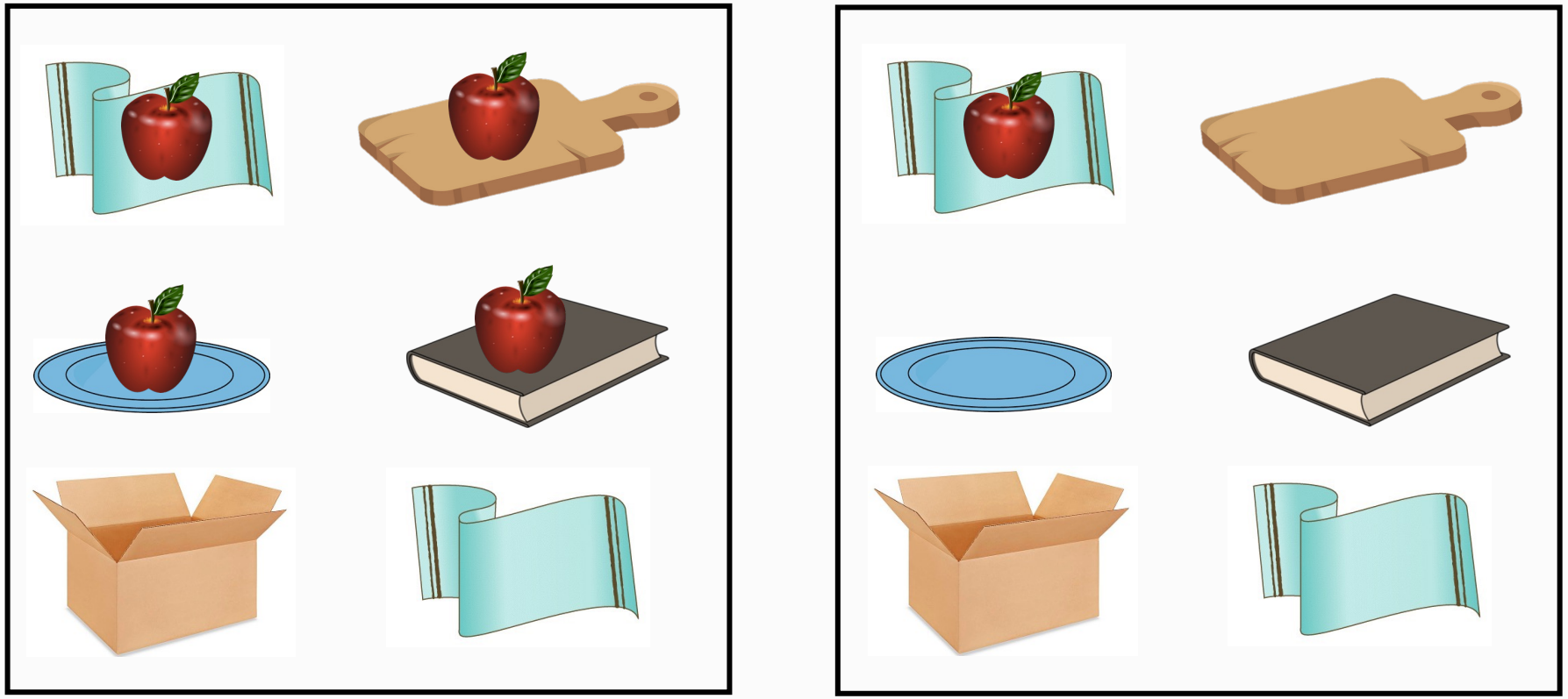
- Analogous to the glass example: you need “on the towel” in the left-hand context but not the right-hand context.



“Put the apple on the towel in the box.”

Evaluating speaker reliability (adults)

- “on the towel” in the right-hand context is weirdly unnecessary information (we’ll come back to this next time)



“Put the apple on the towel in the box.”

Evaluating speaker reliability (kids)

- In an experiment, 3- and 4-year-olds heard a voicemail message from "Birdie":

"Hi Mark, It's me, Birdie. I'm playing on the playground and I just remembered that I forgot my **blicket**. Can you please find my **blicket** and send it to me? Thanks! Bye bye!

- Two conditions:
  1. Experimenter portrays self as very knowledgeable about Birdie's toys, including blickets.
  2. Experimenter lacks certainty, and she says she's just guessing which one the blicket is.

Sabbagh & Baldwin (2001)

Evaluating speaker reliability (kids)

1. Experimenter portrays self as very knowledgeable about Birdie's toys, including blickets.

   Example:

   "I've seen birdie play with these a lot. I know what all of these toys do. I'll show you what this one does."

   "I know just which one is the blicket". [after mailing] "good. Now birdie will get her blicket"

1. Experimenter lacks certainty, and she says she's just guessing which one the blicket is.

   Example:

   "I've never seen Birdie play with these. I wonder what this one does. I've never seen these toys before."

   "I don't know what a blicket is. Maybe it's this one" [after mailing] "Maybe now birdie will get her blicket"

Sabbagh & Baldwin (2001)

Evaluating speaker reliability (kids)

- In an experiment, 3- and 4-year-olds heard a voicemail message from “Birdie”
- Two conditions:
  1. Experimenter portrays self as very knowledgeable about Birdie’s toys, including blickets.
  2. Experimenter lacks certainty, and she says she’s just guessing which one the blicket is.

Practice for Assignment #2

- What do you think the researchers’ question was?
- What theories were they trying to adjudicate between?
- What was the experimental design?
- What were the predictions for each theory?

Sabbagh & Baldwin (2001)

Evaluating speaker reliability (kids)

Practice for Assignment #2

- What do you think the researchers' question was?
  - Do children ages 3-4 use information about speaker reliability in conversation?
    - More specifically: do they use this information to learn new words?

- What theories were they trying to adjudicate between?
  1. Children ages 3-4 **use** information about speaker reliability in the way adults do.
  2. Children ages 3-4 **don't use** information about speaker reliability in the way adults do.

Sabbagh & Baldwin (2001)

Evaluating speaker reliability (kids)

Practice for Assignment #2

- What was the experimental design?
  - Children have to find an unknown toy with a new name for a character with a reliable and knowledgeable speaker or with an uncertain and not knowledgeable speaker.

- What were the predictions for each theory?
  1. Children ages 3-4 **use** information about speaker reliability in the way adults do.
     - If this is true, children will learn the word and learn what toy a blicket is from the knowledgeable speaker but not from the unknowledgeable one.
  2. Children ages 3-4 **don't use** information about speaker reliability in the way adults do.
     - If this is true, children will learn the word and learn what toy a blicket is from both speakers.

Sabbagh & Baldwin (2001)

Evaluating speaker reliability (kids)

Results

- Children exposed to the knowledgeable experimenter…
  - were more likely to say “blicket” when talking about objects
  - were more likely to correctly identify what toy the blicket was

What can we conclude? Which theory is more supported by the results?

- Children ages 3-4 take into account speaker reliability
- Their learning is influenced by their estimation of the reliability of the adult’s knowledge

Sabbagh & Baldwin (2001)

Alignment

- **Alignment:** mirroring the speech of others you're in conversation with (same word choices and syntactic patterns)
  - Typically happens with people you want to impress and with people you admire
  - But it can also happen to facilitate cooperation

- Example: Participants play a computerized maze game
  - One participant has to guide the other to a destination in a maze of interconnected boxes
  - The speaker had a number of ways they could describe the locations in the maze

Garrod & Anderson (1987)

Alignment

(A) Sample dialogue illustrating a “path” strategy

Speaker A: Right from the bottom left-hand corner: above the wee purple thing: go along one and up one and that’s where I am.
Speaker B: Right I’m the same only on the other side.
A: I’m two along, up one now: from the bottom . . . from the left.
B: I’m down one.
A: Oh down one. A: Uh-huh.
A: What, from where?
B: One along from the right . . . I’m one along from the bottom right.

Garrod & Anderson (1987)

Alignment

(B) Sample dialogue illustrating a “coordinates” strategy

Speaker A: O.K.? right—er Andy we’ve got a six by six matrix.
Speaker B: Yup.
A: A, B, C, D, E, F.
B: 1, 2, 3, 4, 5, 6.
A: Correct, I’m presently at C5 O.K.
B: El. A: I have to get to A, B, B, 1. B: Bl.
A: I take it you have to get to D5, is that correct?
B: Er—A, B, C, D, E: A, B, C, D, E. yeah.
A: So you’re now at Dl are you?
B: Uh-huh.

Garrod & Anderson (1987)

Alignment

- Speaker B followed the strategy that Speaker A decided to use.
- It facilitated conversation in the game to use the same words to describe the boxes, even though there was more than one way to describe them.
- This lead to cooperation.

Garrod & Anderson (1987)

Audience design

- **Audience design**: adjusting language to communicate more effectively with a listener

- How do you do this in your lives?
  - Think about content, politeness, topic, language, etc.

- What allows us to do it?
  - Knowledge of the audience
  - Feedback from the hearer (both explicit and implicit)
    - Implicit: **back-channel responses**, which are behavioral cues (e.g., nods, murmurs of agreement, body language) that indicate comprehension

Audience design (adults)

- We've talked a lot about all sorts of ambiguities that crop up in language
- So this might be a good place to test audience design
  - Question: do we adjust our speech to avoid ambiguities to make it easier on the hearer?

- One kind of ambiguity is referential ambiguity
  - When there are two glasses that differ in size, we might say "the tall glass"
  - When there are multiple apples, we might say "the apple on the towel"
- What are some other kinds of ambiguity we talked about?

Audience design (adults)

Yes! …but not all kinds equally

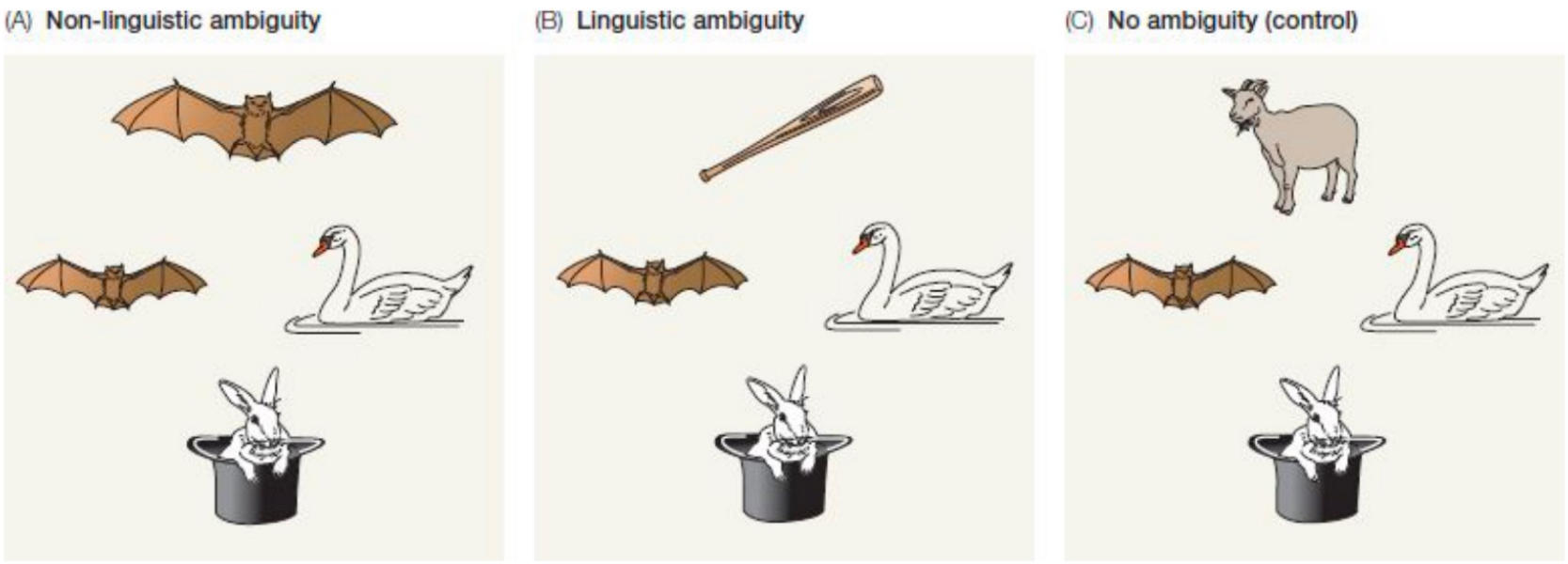
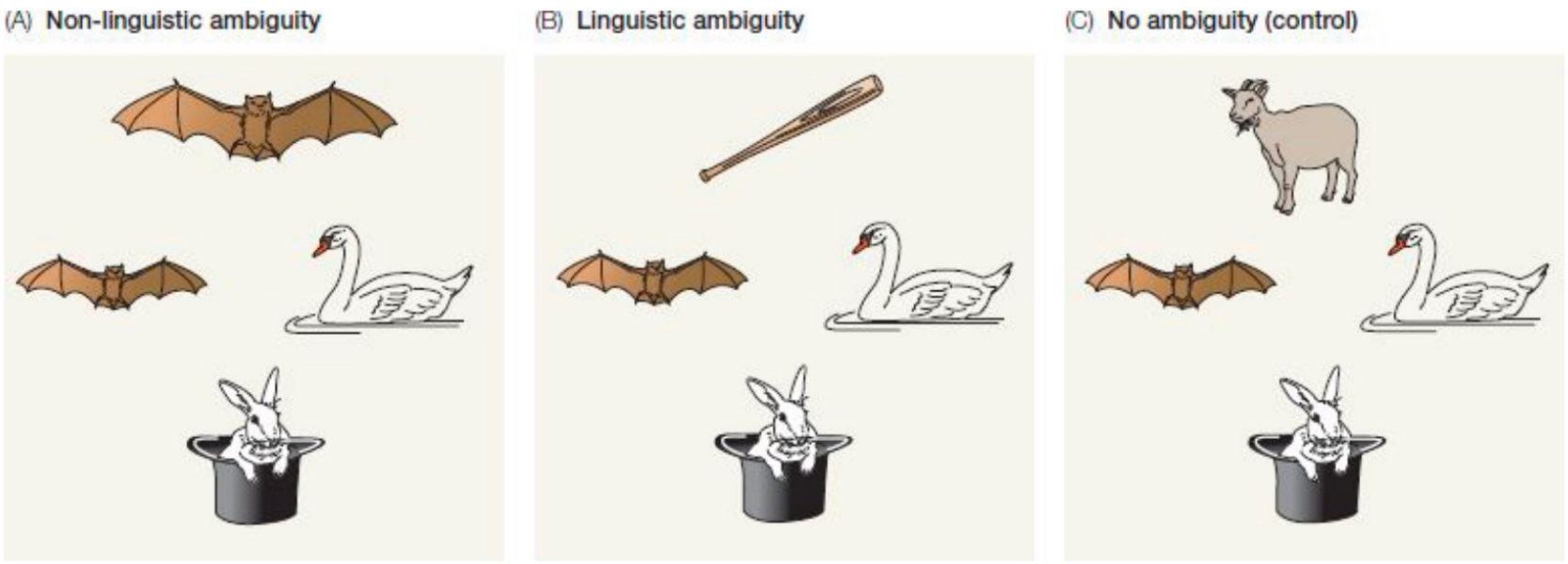


Figure 12.11 Examples of the type of displays used in the study by Ferreira and colleagues (2005). (A) The display contains a potential non-linguistic ambiguity with regard to the word *bat*. (B) There is a potential linguistic (lexical) ambiguity with regard to the word bat. (C) This group displays no potential ambiguity. (Adapted from Ferreira et al., 2005, *Cognition 96*, 263.)

Speakers more often try to avoid non-linguistic (referential) ambiguity than linguistic ambiguity (both lexical and syntactic)

Audience design (adults)

Why?



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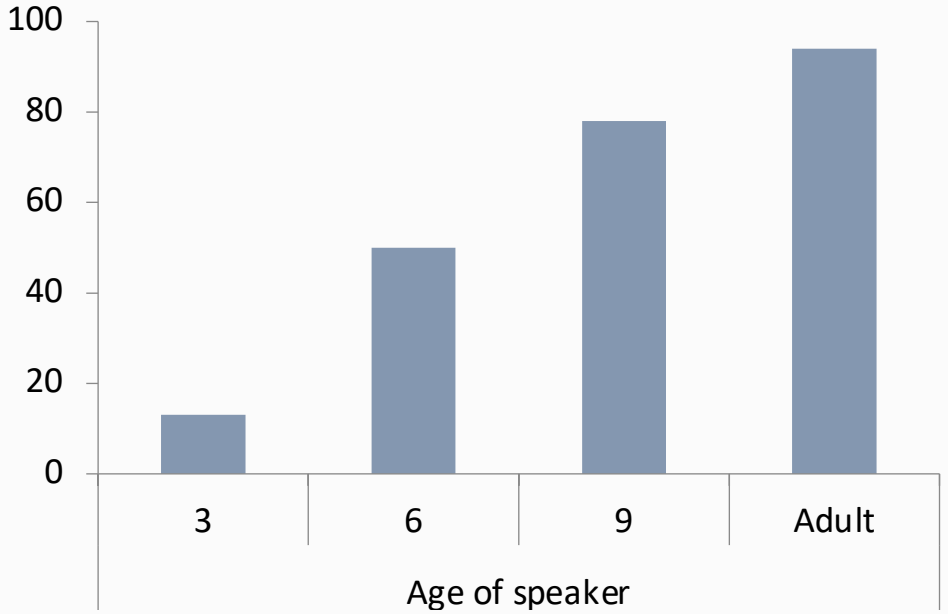
The decision to avoid referential ambiguity can be made at the very start of producing a sentence.

(we'll come back to this next week)

Audience design (kids)

Referential ambiguity in kids

Percentages of unambiguous first descriptions (e.g., “the small blue ball”)



Experimenter points to this object to indicate that speaker should tell partner to pick it up.

Deutsch & Pechmann (1982)

Audience design

Let’s apply this to a real-world example.

Why are professors so bad at audience design?

- Cognitive load? (e.g., working memory demands)
- Stress?
- Curse of knowledge?
- Most probable: lack of feedback (both implicit and explicit)

Theory of mind

- What allows for taking into account specific interlocutors?
  - **Theory of Mind:** recognition that people have different beliefs, knowledge, and intentions than we do under different conditions
  - A person has a Theory of Mind if they keep track of what's going on in other people's minds, independently of their own.

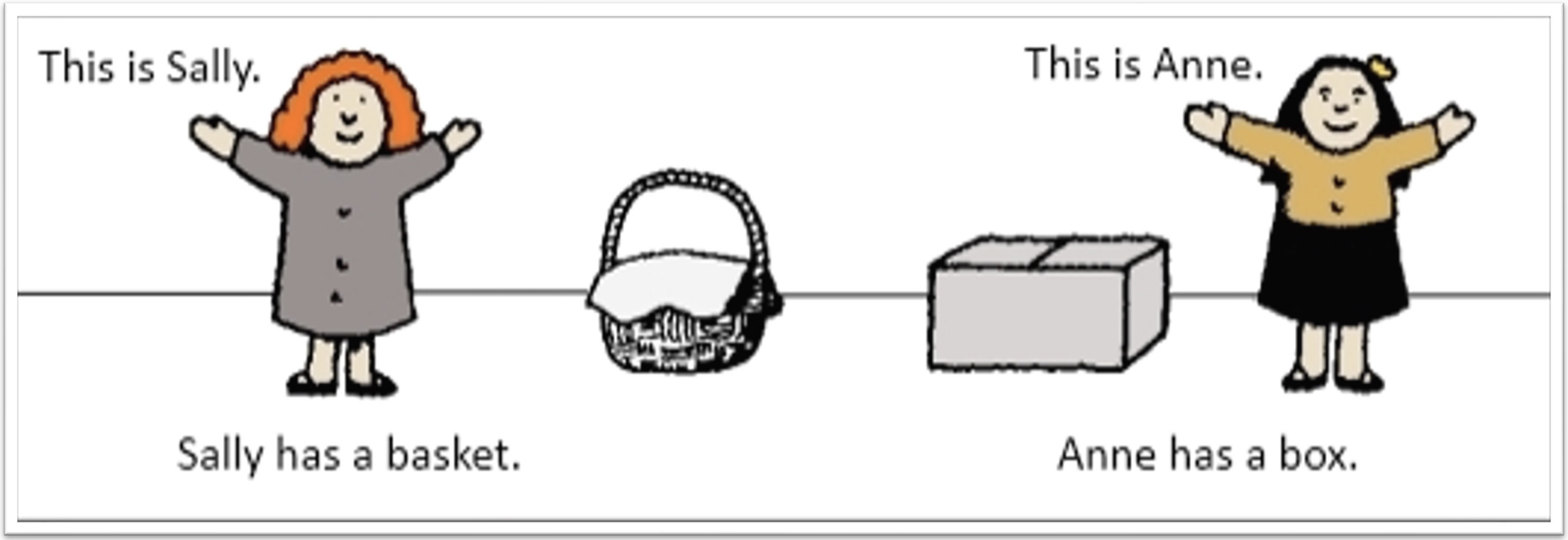
- We need theory of mind to assess speaker reliability (what does this speaker know? Is it reliable?)
- We need theory of mind to establish common ground
- It helps us to decide whether to align or not
- It helps with audience design to know your partner's knowledge may be different from your own

Theory of mind

- Why do we need Theory of Mind for the following:
  - Assessing speaker reliability
    - Is this speaker's knowledge reliable?
  - Establishing common ground
    - Does this speaker know this information or not?
  - Deciding whether or not to align
    - Do we have the same beliefs and goals?
  - Being good at audience design
    - Is this hearer's knowledge different from my own?
    - Are they comprehending what I'm saying?

Theory of mind

Experiment: False Belief Task (kids 4 years old and under)



Theory of mind

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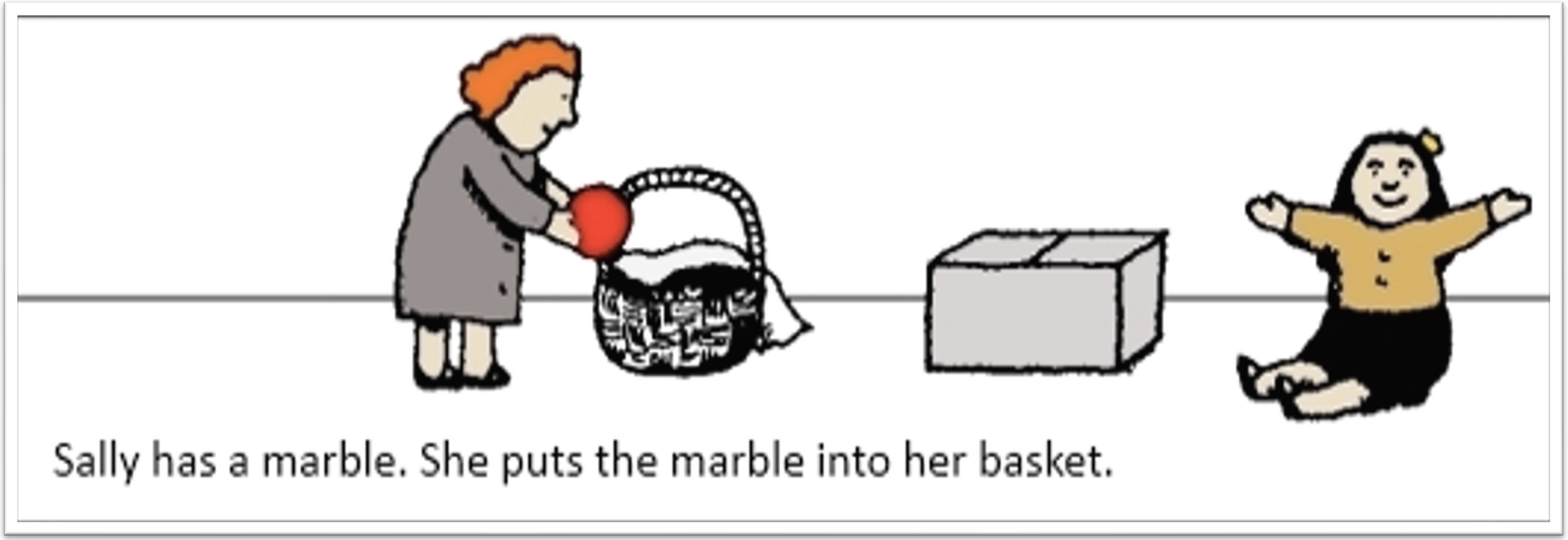

Theory of mind

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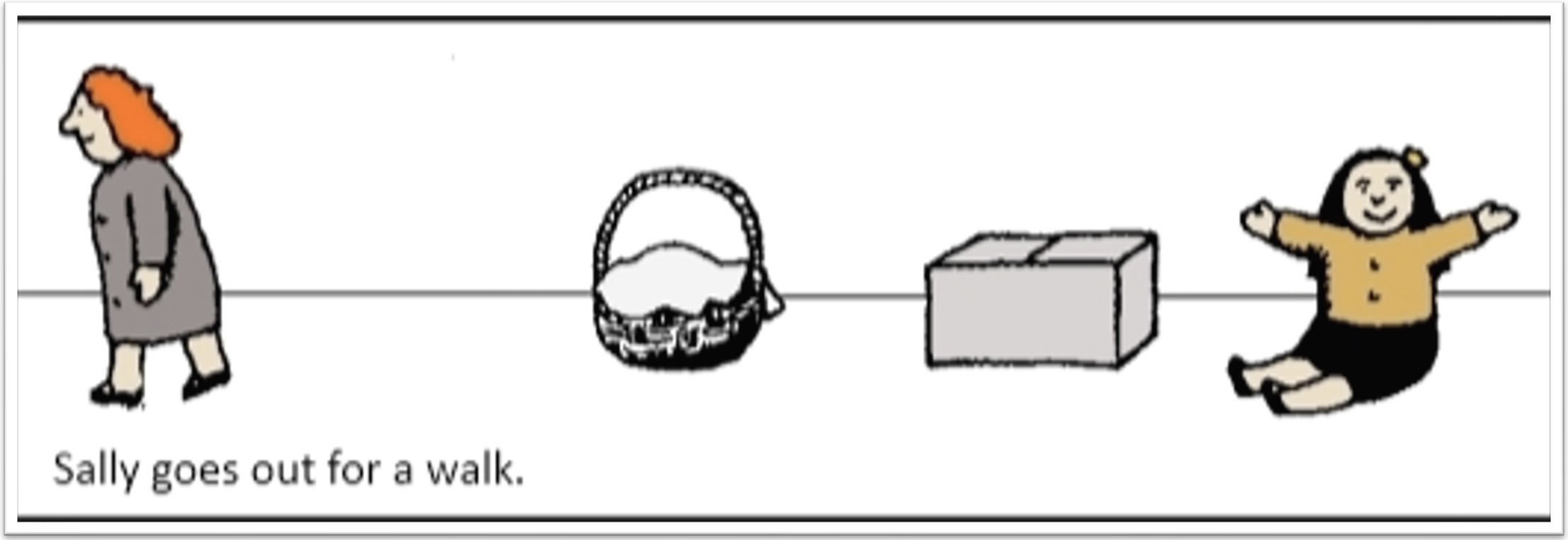

Theory of mind

Experiment: False Belief Task (kids 4 years old and under)

Theory of mind

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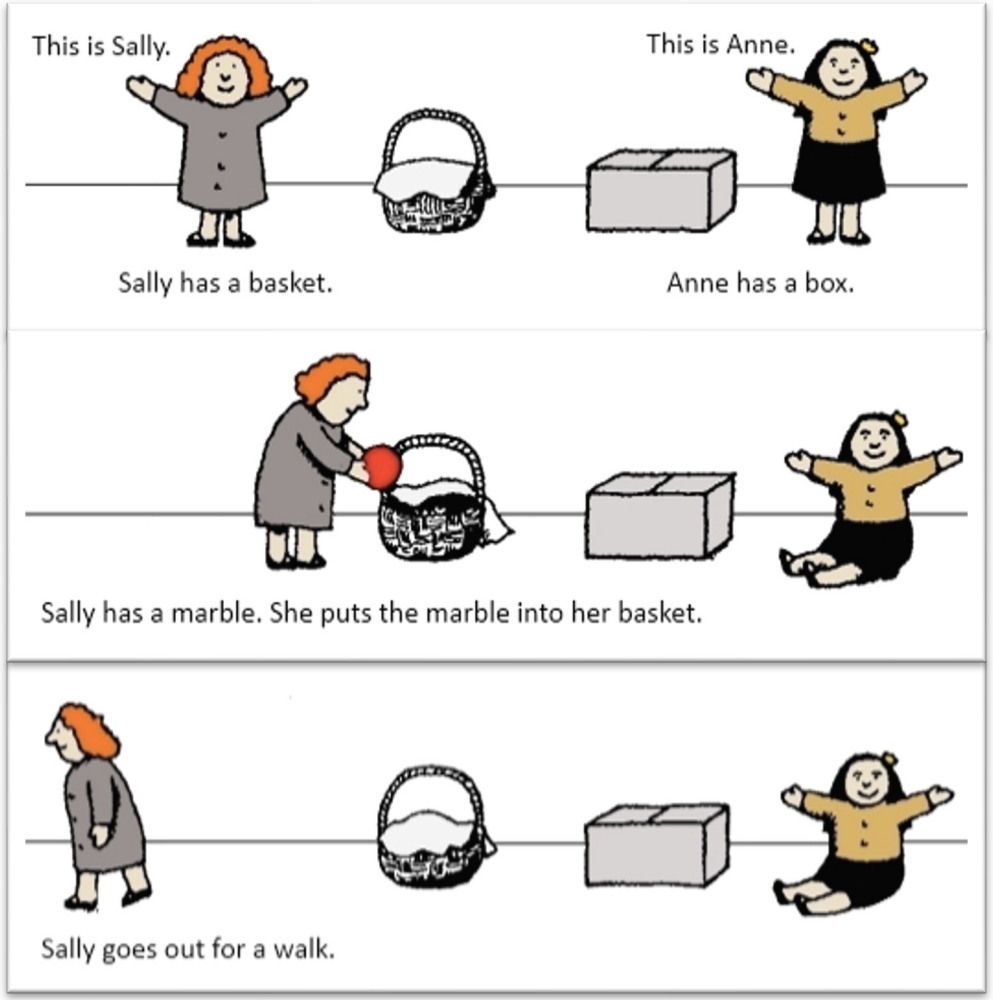
Theory of mind



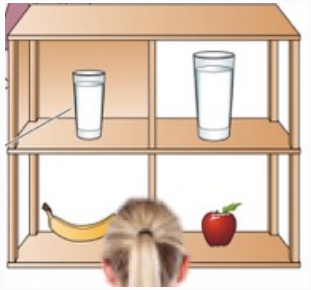
Kids under 4 say, “In the box!”

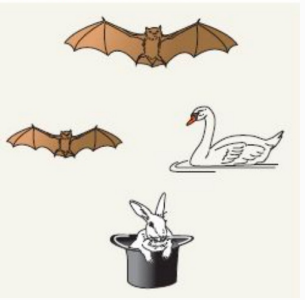
Kids over 4 say, “In the basket!”

Demo: False Belief Task

Demo:
[False believe task]

Review





- How do listeners and speakers adjust their assumptions in specific communicative circumstances?
  - Adults & kids adjust their interpretations based on what is in **common ground**
  - Adults & kids adjust their interpretations/learning based on their impression of the **reliability of the speaker**
    - The more you trust or need to cooperate with the speaker, the more likely you are to align to their language choices (words and syntax)
  - Adults are better than kids at adjusting their productions to avoid ambiguity for the listener (i.e, adults are better at practicing **audience design**)
    - ...but some ambiguities (non-linguistic) are avoided more than others
  - **Theory of mind** is needed for establishing common ground, taking into account the reliability of a speaker, and practicing audience design
    - Theory of mind develops gradually over time
    - Linguistic alignment comes from with people

Key concepts

- ✓Adjusting assumptions in specific communicative circumstances
- ✓Common ground
- ✓Reliability of the speaker
- ✓Theory of mind
- ✓Audience design and back-channel responses
- ✓Speakers avoid some ambiguity but not others
- ✓Alignment