

# LSci 51/CogS 56L: Acquisition of Language

Lecture 12  
Lexical & morphological  
acquisition III

# Announcements

Be working on HW4 (due 8/26/25)

- Note: Remember that working in a group can be very beneficial.

Be working on the lexical & morphological acquisition review questions

# Morphological acquisition

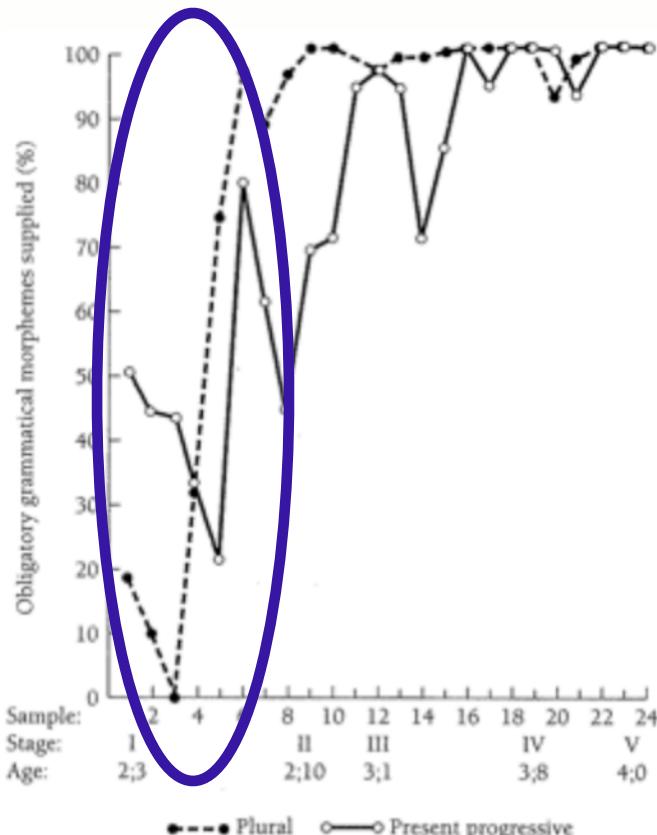


# Morphological acquisition

Between 2 and 3 years old, English children begin adding in the more “grammatical” categories - in particular the bound morphemes.

Usage of bound morpheme (either -ing progressive or -s plural) when required

Development is gradual (though may have spurt-like parts), and there are large ranges - not all bound morphemes come in at the same time



THE DEVELOPMENT OF THE PROGRESSIVE AND PLURAL INFLECTIONS IN ONE CHILD'S SPEECH

# Getting at children's morphological knowledge: the wug test

<https://www.youtube.com/watch?v=1Lb6phcDte4>

5:41-6:28: the wug test

6:29-7:24: interpreting the wug test



# Morphological acquisition

Development is gradual: 2- to 3-year-old English-learning children sometimes use the **bare form of verbs even when they mean the past tense** (like *kiss* instead of *kissed*).

This may be because the past tense in English is a less frequent intended meaning than the present tense, and the present often is a bare form (*I kiss the kitten, you kiss the kitten, we kiss the kitten, ...*). Children have **trouble inhibiting** the more-frequently-used present (bare) form, even while they understand the past tense appropriately (Barak, Harmon, Feldman, Edwards, & Shafto 2023)



# Something tricky: English has multipurpose morphology

<https://www.youtube.com/watch?v=Ts2DS0ZsTyo&feature=youtu.be>  
4:31-4:52



# Morphological acquisition

The order of acquisition for bound morphemes in English does appear to be similar across different children, however (even if their rates of development are quite different).

Brown (1973): three children (Adam, Eve, Sarah)

- |                                |  |
|--------------------------------|--|
| (1) present progressive:       | laugh <i>ing</i> /ɪŋ/                                    |
| (2) plural:                    | cat <i>s</i> /s/, dog <i>s</i> /z/, glass <i>es</i> /əz/ |
| (3) possessive:                | cat's /s/, dog's /z/, glass's /əz/                       |
| (4) regular past tense:        | touched /t/, hugged /d/, wanted /əd/                     |
| (5) 3rd person singular:       | laughs /s/, hugs /z/, touches /əz/                       |
| (6) contracted <i>be</i> :     | The cat's going to /s/, he's going to /z/                |
| (7) contracted auxiliary verb: | he'd like to /d/, he'll have to /l/                      |

Note: Chan & Lignos (2011) describe a learning strategy that could cause English children to produce this order, based on how hard or easy it is to recognize that a derived form like “hugs” is related to a base form like “hug”.

# Morphological acquisition

The order of acquisition for bound morphemes in English does appear to be similar across different children, however (even if their rates of development are quite different).

But what about development cross-linguistically? Remember, English is fairly impoverished morphologically when compared to languages like Hungarian.

English: “the goblin” = always the same form

Hungarian: “the goblin” may have up to 16 different forms, depending on what “the goblin” ’s role in the sentence is

# Morphological acquisition

Important: Morphologically rich languages are not necessarily more difficult for children to learn. Regular/predictable systems are easier for children to learn than languages that have multiple exceptions (like English often does).

Regularity vs. exceptions in English (ex: past tense):

We **laughed**.

We **hugged**.

We **danced**.

\* We **singed**. (We **sang**.)

\* We **runned**. (We **ran**.)

# Morphological acquisition

Other factors that help make morphology easier to learn:

- **high frequency** (more frequent morphemes are easier)
- **regularity** in form (morpheme is always the same)
- **fixed position** relative to the stem (ex: morpheme always attaches to the end of the word)
- morpheme is easy to recognize as **separate** from the stem (ex: laugh + **ing**)
- rhythm of language makes morpheme **perceptually salient** (ex: receives stress)

# Morphological acquisition

Things that make acquisition easier

In Chintang, a Sino-Tibetan language spoken in Nepal, there are three different morphemes indicating aspect (e.g., perfective vs. imperfective).

The most frequent morpheme is acquired earliest, while regularity, position, and separability predict order of acquisition for the other morphemes (Mažara & Stoll 2021)



# Morphological acquisition

But development is still gradual: Spanish-learning children sometimes use the third singular present form of verbs even when they mean other things (like *besa (he/she/it kisses)* instead of *beso (I kiss)*, *besas (you-sg kiss)*, or *besan (they kiss)*).

This may be because the third singular present form is more frequent, easier to remember, or has an aspect of its meaning that's easier to remember than the alternative appropriate forms.

(Barak, Echeverri, Feldman, & Shafto 2023)



# Morphological acquisition recap

Children must learn how their language puts words together, and what types of meaning can be conveyed via morphology.

Not all morphology is acquired at the same time — different factors like frequency, separability, and position (among others) make some morphology easier to acquire than others.

Languages of the world vary in how rich their morphological systems are. Importantly, just having more morphology doesn't make a system hard to learn: predictable systems are easier to learn than unpredictable systems, no matter how much morphology there is (or isn't) in the language.

# Lexical acquisition recap: A lot of nouns early on



Braginsky, Yurovsky, Marchman, & Frank  
2015, 2017: “over-representation of nouns” in  
early vocabularies.



Adults and older children have more variety, including more abstract nouns, as well as other syntactic categories like verbs (*laugh, kiss*), prepositions (*with, from*), determiners (*the, a*), and adjectives (*silly*).

## So what about those other word types?

other syntactic categories like verbs (*laugh, kiss*),  
prepositions (*with, from*), determiners (*the, a*), and  
adjectives (*silly*).

# How might verbs be learned?

Proposal for vocabulary development (Snedeker & Gleitman 2002):

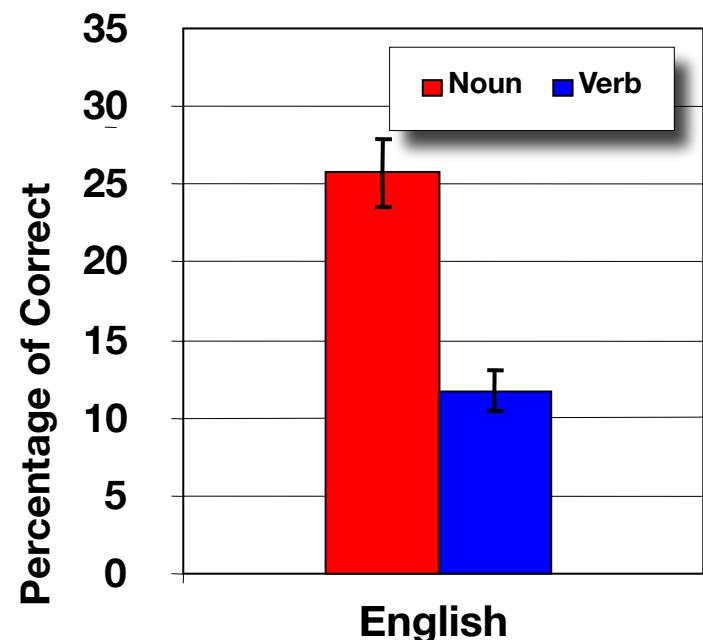
## 1. Learn from Scenes

- Child relies on situational context alone
- Can learn only **very concrete words**: object labels



Remember: Nouns seem to be easier to guess from context

(Snedeker, Gleitman, and Brent 1999)



# How might verbs be learned?

Proposal for vocabulary development (Snedeker & Gleitman 2002):

1. Learn from Scenes
2. Learn from Nouns

- Object labels provide richer representation of linguistic context
- Utterance = set of known nouns
- Child can learn concrete relational words like spatial prepositions (ex: “near”) and many verbs

I, it, you

# How might verbs be learned?

Proposal for vocabulary development (Snedeker & Gleitman 2002):

1. Learn from Scenes
2. Learn from Nouns
3. Learn from Syntactic Frames
  - Learning relational words allows the child to learn the basic grammar of her language
  - Utterance is represented as a syntactic structure + known words
  - This representation allows the child to learn more abstract words

Can po SIRN while lo nirp nu?

# Snedeker & Gleitman (2002)

- Targets
  - Videotaped interactions of 4 mother-child pairs
  - 24 most common **verbs** chosen as targets
  - for each target, 6 instances randomly selected
- Subjects participated in one of 7 Information Conditions
  - Scenes
  - Nouns
  - Frames
  - Scenes + Nouns
  - Scenes + Frames
  - Nouns + Frames
  - Scenes + Nouns + Frames

# Scenes condition

Example “mystery verb”: “play”



Guess word.

Task: Subjects guess mystery verb from watching 6 instances of word use in video clips. The video clips are silent except beeps replace the moments the mystery word were uttered.



Guess word again.

Etc....

Final guess

On to next mystery verb

# Nouns condition

Example “mystery verb”: “play”

**1. elephant, piano**

**Guess word.**

**2. mommy**

**Guess word again.**

**3. I, it, you**

**Guess word again.**

**4. it, you**

**Guess word again.**

**5. drums**

**Guess word again.**

**6. music, you**

Task: Subjects shown the nouns co-occurring with the mystery verb in 6 sentences, the same sentences as those in the video clips with the beeps.

**Final guess**

**On to next mystery verb**

# Frames condition

Example “mystery verb”: “play”

1. Can kax SIRN the bussit?

Guess word.

2. Noggle SIRN?

Guess word again.

3. Can po SIRN while lo nirp nu?

Guess word again.

4. Lo are gonna SIRN nu?

Guess word again.

5. SIRN the nep.

Guess word again.

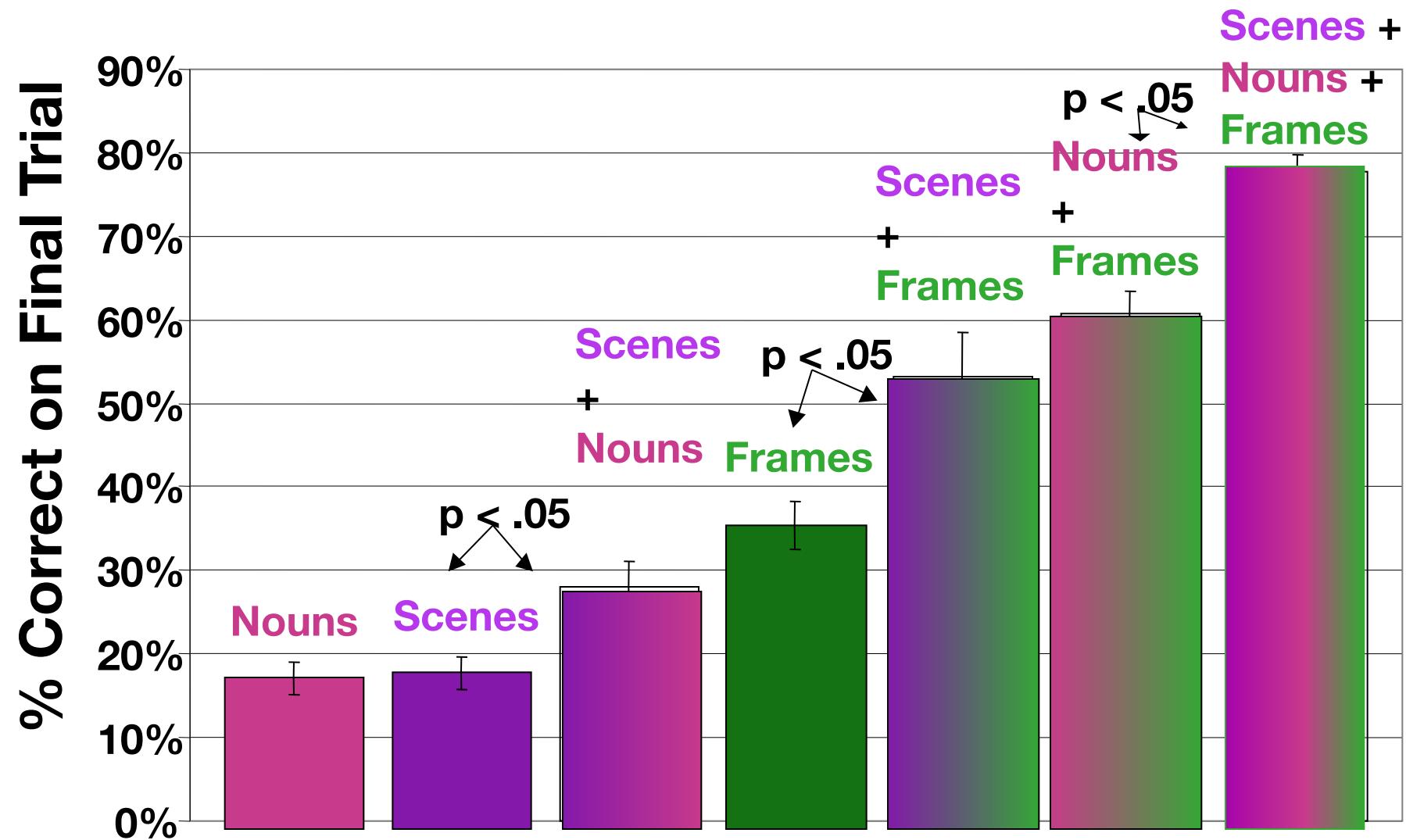
6. Lo SIRN tuggy wilm.

Task: Subjects guess the mystery verb from the 6 sentence frames. The sentence frames are constructed by replacing words in the 6 utterances with nonsense words.

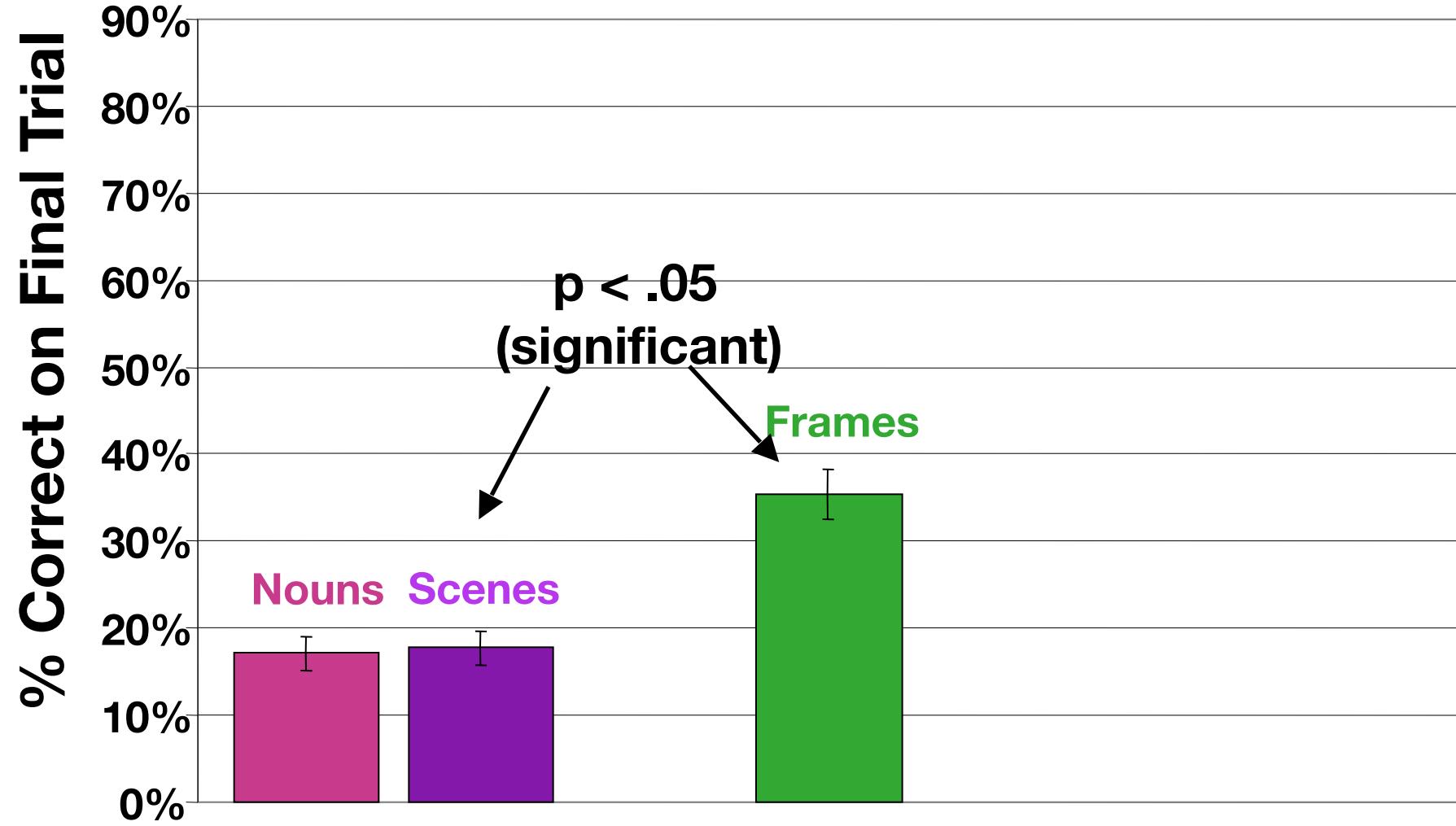
Final guess

On to next mystery verb

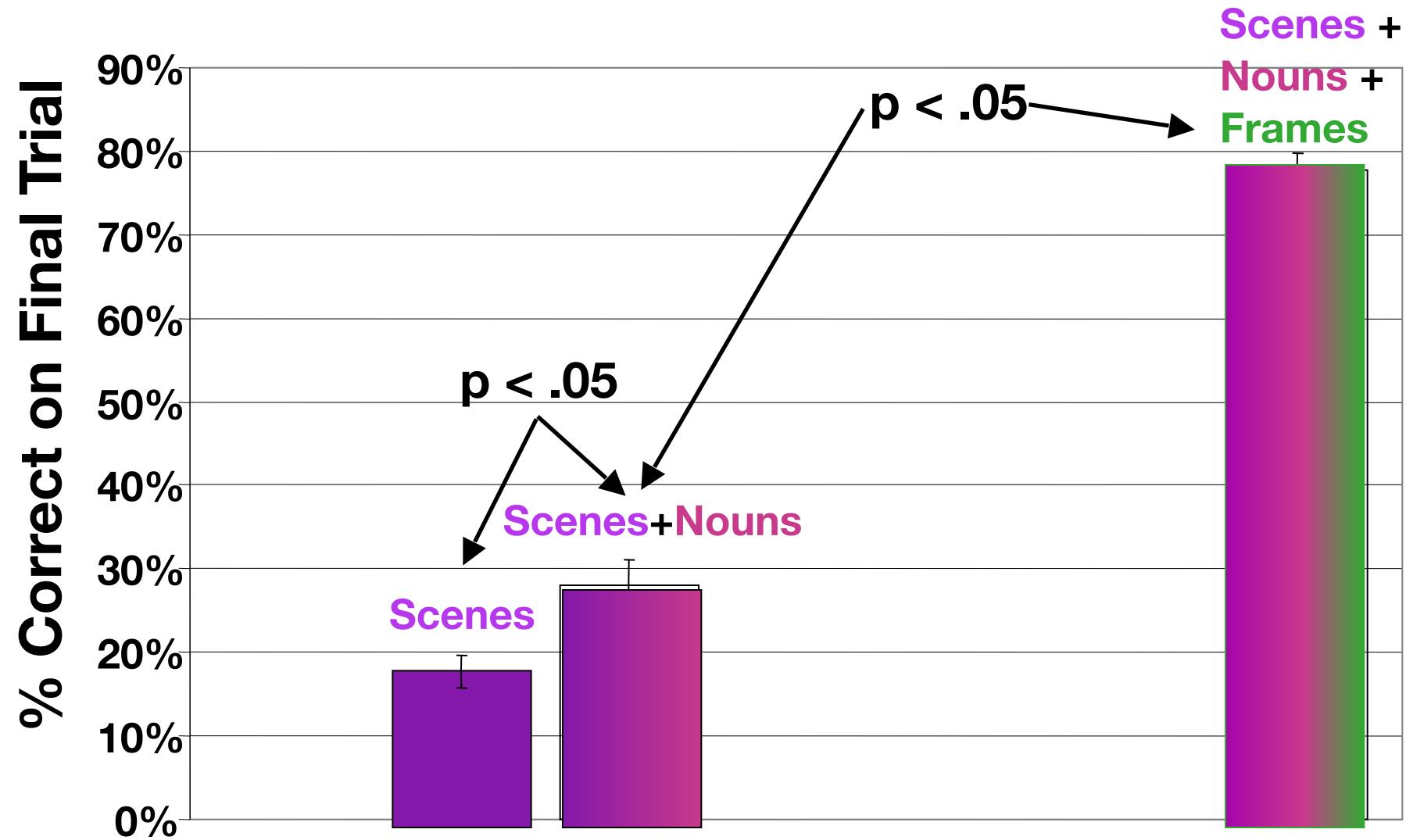
# Correct identification varies with information condition



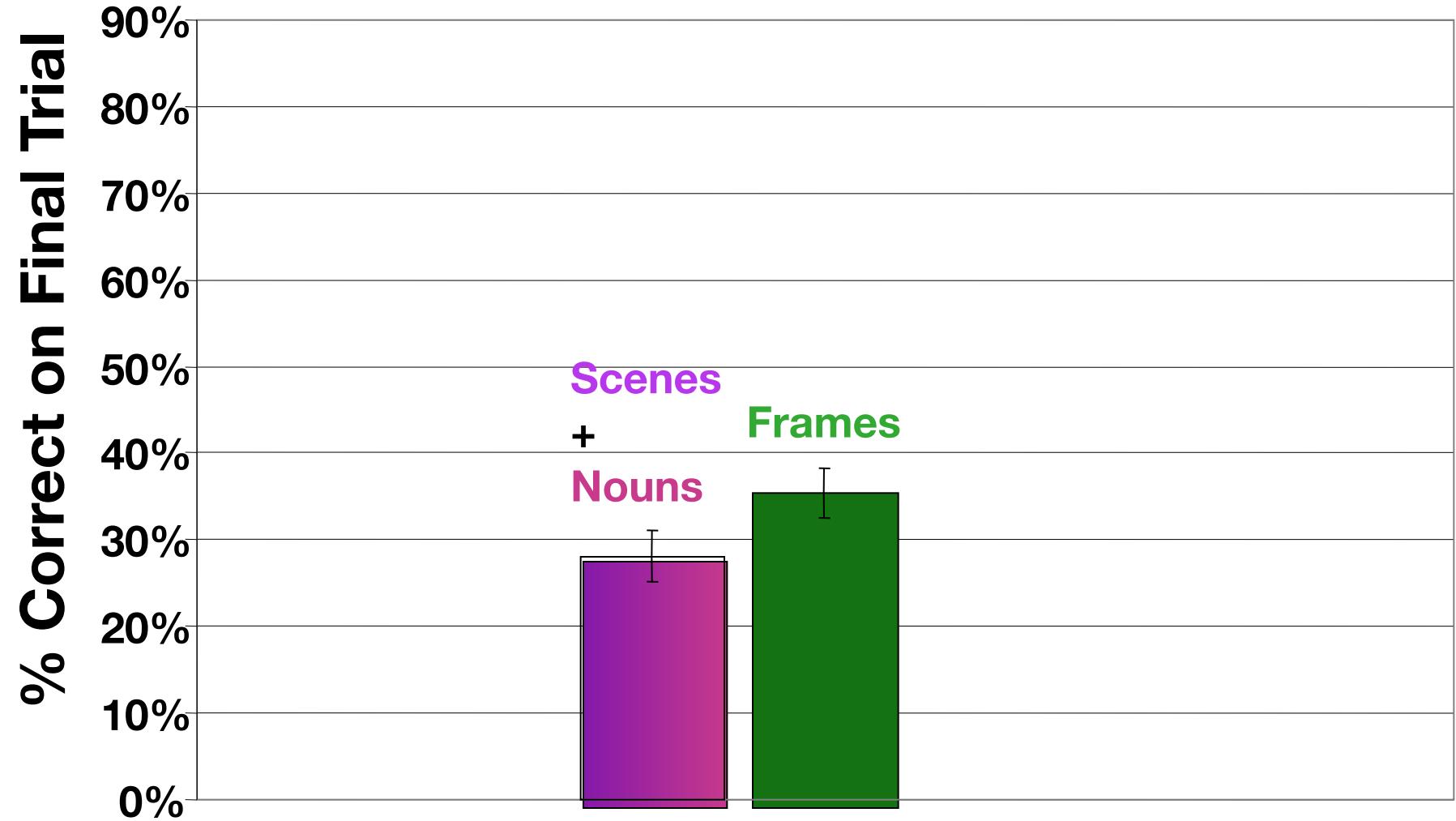
# Syntactic frame information alone is best if you only get one



# Having more information of different types definitely helps

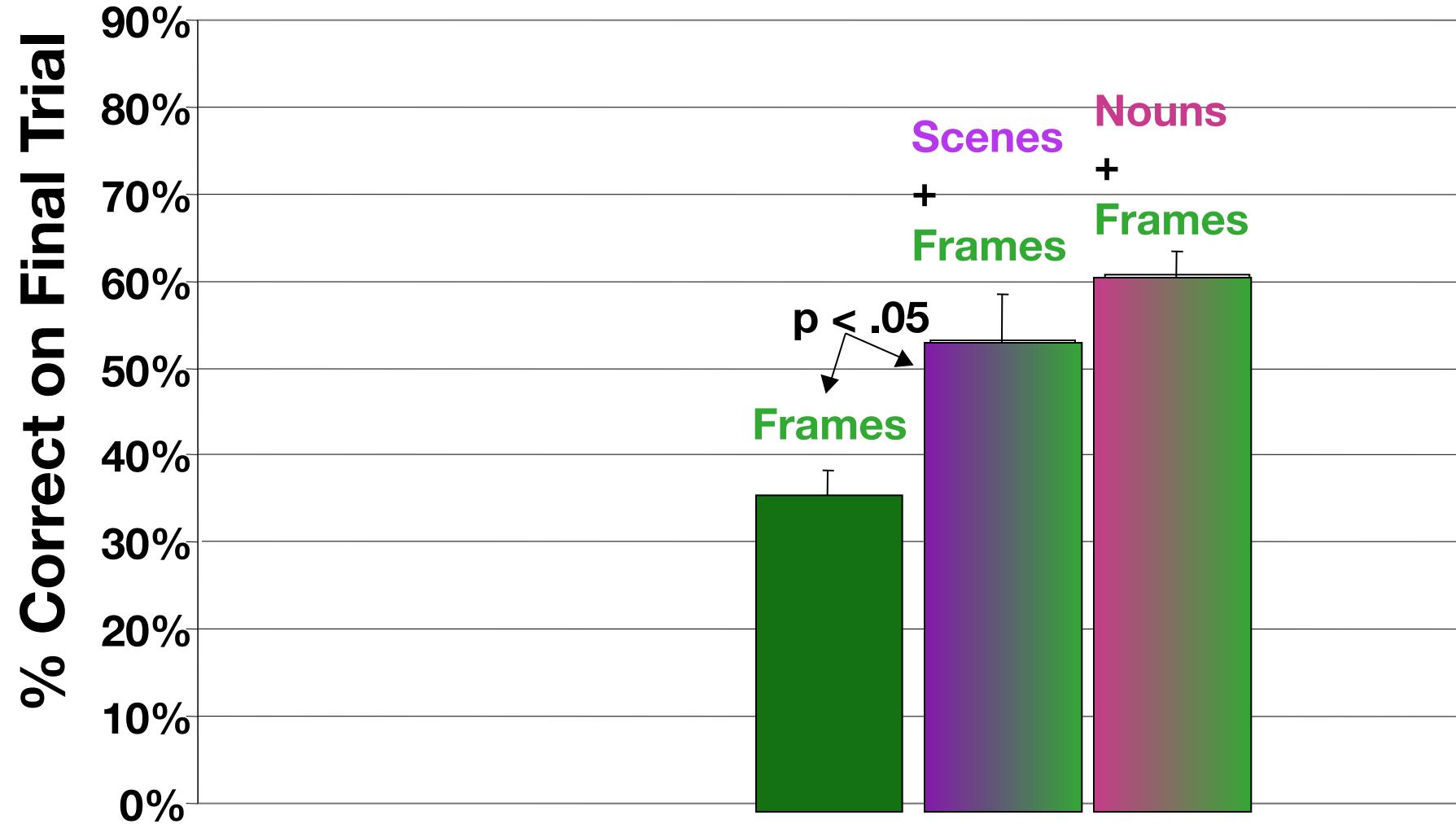


# Utility of syntactic frame knowledge: Scenes + Nouns equivalent to Syntactic Frames only



# Utility of additional knowledge with Frames:

Scenes + Frames equivalent to Nouns + Frames which  
is better than Frames alone



So Snedeker & Gleitman (2002) have shown that maybe learning verbs isn't so bad once you have some linguistic background (like knowing some nouns and some syntactic frames) and informative situational context (scenes)



Additional support for this idea: visual information (especially from the child's viewpoint) + linguistic context information is helpful for human learners (Zhang, Amatuni, Cain, Wang, Crandall, & You 2021)

# Leveraging known words

On Borovsky, Ellis, Evans, & Elman 2015:

“Children leverage their early world knowledge to help them unlock their language skills. Knowing a few related words helps children recognize links between new word meanings, and this could be a very useful strategy for helping children learn vocabulary early in life. This might be part of the explanation for why children begin to start 'talking up a storm' between the ages of 18-24 months.” — Arielle Borovosky



<https://www.sciencedaily.com/releases/2015/10/151012132455.htm>

# Knowing what to guess

## Clues from the input

27-month-olds (LaTourrette, Waxman, Wakschlag, Norton & Adriana Weisleder 2023) and 19-month-olds (Ferguson, Graf, & Waxman 2014, 2018) and can **use known words** (like the verb “crying”) to figure out unknown words.

Ferguson, Graf, & Waxman 2014, 2018

Sample test scenario, where only animate things can cry



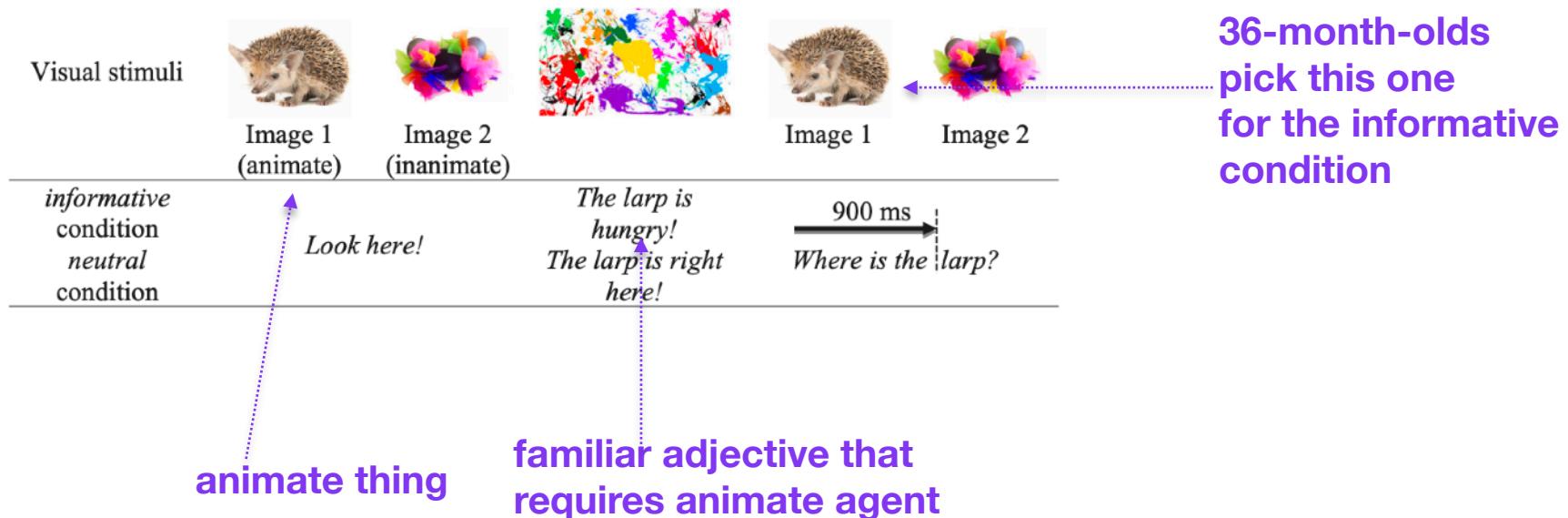
# Knowing what to guess

Clues from the input

...but it's not till 36 months, that children can use **known adjectives** (like “hungry”) to figure out unknown words.

Syrett, LaTourrette, Ferguson, & Waxman 2019

Sample test scenario, where only animate things can be hungry



# Knowing what to guess

Clues from the input: what you know helps you learn new things

Ferguson, Graf, & Waxman 2018: At both 19 and 24 months, the number of verbs infants know predicts their ability to use known verbs to learn novel nouns.



# Knowing what to guess

Clues from the syntactic structure

Different syntactic categories (noun, verb, etc.) tend to have different meanings. Once children have identified some syntactic categories (after ~14 months), they can use the syntactic structure (how words appear together) as a clue to meaning.



“Those are goblins.”

goblins = noun

nouns = objects

goblins =



# Using syntactic structure

## [Extra]

<http://www.thelingspace.com/episode-35>

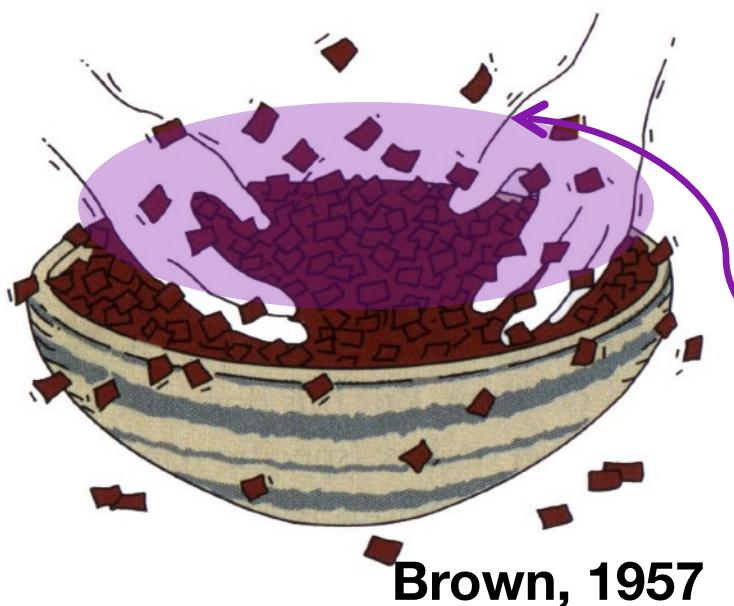
<https://www.youtube.com/watch?v=Ci-5dVVvf0U>

5:07 - 6:19



# Knowing what to guess

Clues from the syntactic structure



**He's sebbing!**

**seb = verb**

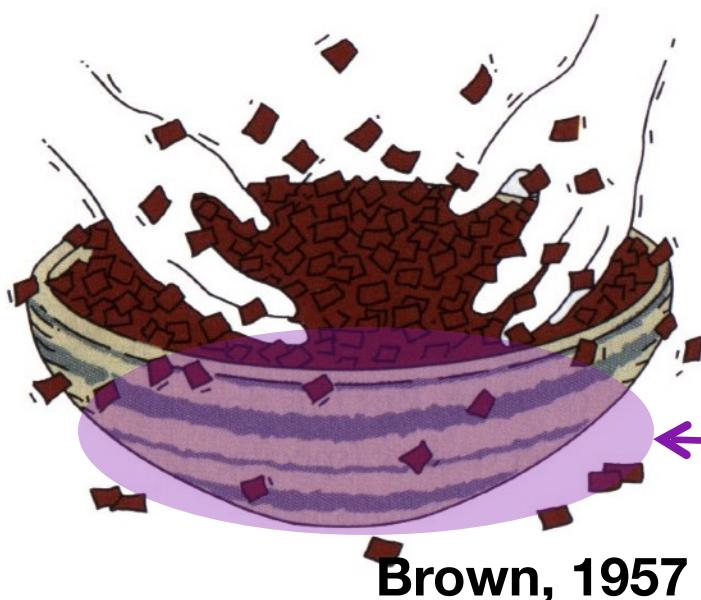
**verb = action**

**seb**

# Knowing what to guess

Clues from the syntactic structure

Look – **a** seb!



**seb = noun with “a”**

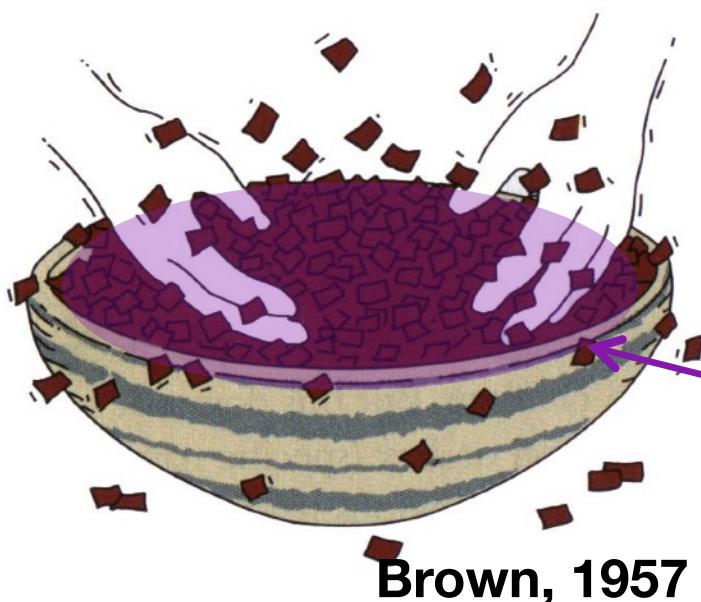
**noun = countable object  
like “bowl”**

**seb**

# Knowing what to guess

Clues from the syntactic structure

Look – **some seb!**



**seb = noun with “some”**

**noun = mass substance  
like “stuff”**

**seb**

# Knowing what to guess

Clues from the syntactic structure



Kids are able to do the same thing at different ages

3- and 4-year-olds: He, Kon, & Arunchalam 2019 (“The penguin **is pilking**”)

2-year-olds: Klein & Snedeker 2015 (**I'm daxing** (to) my toy” vs. )

27-month-olds: Syrett, Arunachalam, & Waxman 2014 (“It's **gonna** pilk **slowly**”)

23-month-olds: Bernard et al. 2007 (“It **dases**” vs. “**a** dase”)

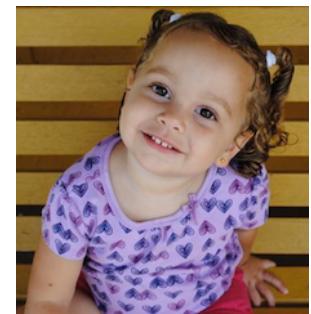
18-month-olds: He & Lidz 2017 (“**it's pratch****ing**”)

# Knowing what to guess

Clues from the syntactic structure

Paquette-Smith & Johnson 2016: 2-year-olds already rely on some grammatical cues more than eye gaze in cases of ambiguity.

Training 1		<i>"THESE ARE nice blicketS. Can you find the blicketS?"</i>	
2		<i>"Where IS the blicket_? Can you see A blicket_?"</i>	



During training, the speaker looks at a different referent than what the grammatical cues indicate.

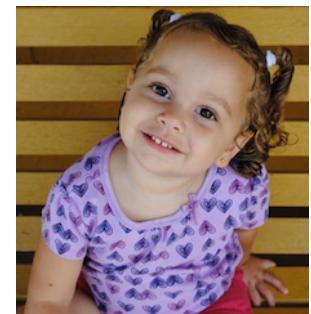


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Training 1		<i>"THESE ARE nice blicketS. Can you find the blicketS?"</i>	
2		<i>"Where IS the blicket_? Can you see A blicket_?"</i>	



Two-year-olds prioritize the grammatical cues and figure out the right referent.

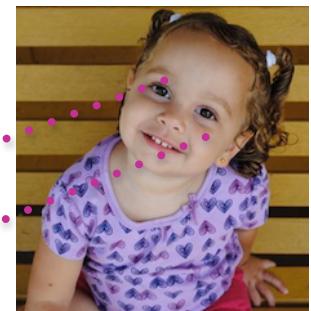


# Knowing what to guess

Clues from the syntactic structure

Paquette-Smith & Johnson 2016: 2-year-olds already rely on some grammatical cues more than eye gaze in cases of ambiguity.

We can see this because they **look to the correct referent** when we test them afterwards (and the grammatical cues are again present).



Test 1		 "Look at the blicket. Do you like IT?"	
2		 "Look at the blicketS? Do you like THEM?"	

# Knowing what to guess

Clues from the syntactic structure

Paquette-Smith & Johnson 2016: 2-year-olds already rely on some grammatical cues more than eye gaze in cases of ambiguity.

One thought on why this might be from Lidz (2019):

Children “expect words with similar meanings to have similar distributions, and so learning depends on a memory for syntactic environments. The [non-linguistic] context in which a word is used is less constrained and hence contributes less to the memories that drive word learning.”

grammatical cues = syntactic environment

eye gaze = non-linguistic context



# Knowing what to guess

Syntactic Bootstrapping Hypothesis: primarily using the syntactic structure to get to meaning

Naigles (1990): 2-year-olds can use syntactic structure to guess aspects of word meaning, including the difference between transitive and intransitive verbs



Transitive: The rabbit is **gorping** the duck.

(expectation: rabbit is doing something to the duck)



Intransitive: The rabbit and the duck are **gorping**.

(expectation: rabbit and duck doing actions separately)



# Knowing what to guess

Syntactic Bootstrapping Hypothesis: primarily using the syntactic structure to get to meaning

Yuan & Fisher (2009), Scott & Fisher (2009), Messenger, Yuan, & Fisher (2015): 2-year-olds can keep track of the syntactic structures in which a verb appears and use that to infer a verb's meaning.



Transitive dialogue

A: Guess what? Jane blicked the baby!  
B: Hmm. She blicked the baby?  
A: And Bill was blicking the duck.  
B: Yeah, he was blicking the duck.

Example verb: kiss

Intransitive dialogue

A: Guess what? Jane blicked!  
B: Hmm. She blicked?  
A: And Bill was blicking .  
B: Yeah, he was blicking.

Example verb: sneeze

# Knowing what to guess

Syntactic Bootstrapping Hypothesis: primarily using the syntactic structure to get to meaning

Yuan & Fisher (2009), Scott & Fisher (2009), Messenger, Yuan, & Fisher (2015): 2-year-olds can keep track of the syntactic structures in which a verb appears and use that to infer a verb's meaning.



Causal dialogue

A: Matt dacked the pillow.

B: Really? He dacked the pillow?

A: Yeah. The pillow dacked.

B: Right. It dacked.

Example verb: melt

Unspecified-object dialogue Example verb: eat

A: Matt dacked the pillow.

B: Really? He dacked the pillow?

A: Yeah. He dacked.

B: Right. He dacked.

# Knowing what to guess

Syntactic Bootstrapping Hypothesis: primarily using the syntactic structure to get to meaning

18-month-old children recognize that determiners (like *the*) precede nouns (like *ball*) (Cauvet et al. 2014, Kedar, Casasola, Lust, & Parmet 2017, de Carvalho, He, Lidz, & Christophe 2019) and pronouns (like *I*) precede verbs (like *eat*) (Cauvet et al. 2014).



# Knowing what to guess

Syntactic Bootstrapping Hypothesis: primarily using the syntactic structure to get to meaning

Harrigan, Hacquard, & Lidz (2019, 2022): Four-year-olds can use the syntactic context to tell the (subtle) differences between mental state verbs reflecting attitudes, like *think*, *want*, and *hope*.

Jack \_\_\_s that Lily is home.

*think*  
✓

Jack \_\_\_s to be home.

*want*  
✓

Jack \_\_\_s Lily to be home.

*hope*  
✓  
✓

Jack \_\_\_s for Lily to be home.



# Knowing what to guess

Syntactic Bootstrapping Hypothesis: primarily using the syntactic structure to get to meaning

Li 2022: Mandarin also has subtle syntactic differences children could notice between mental verbs like *know* and perception verbs like *see*.



# Knowing what to guess

Syntactic Bootstrapping Hypothesis: primarily using the syntactic structure to get to meaning

Gotowski & Syrett 2023: English has subtle syntactic differences that children could track to tell the difference between subjective adjectives like **tough**, **pretty**, **smart**, **tasty**, and **tall**.

This game is \_\_\_\_

This dress is \_\_\_\_ to wear to a party.

This kitten looks \_\_\_\_ to me.

It is \_\_\_\_ for her to pet the kitten gently.

Petting the kitten gently is \_\_\_\_.



# Knowing what to guess

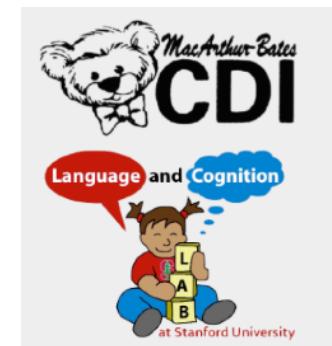
Syntactic Bootstrapping Hypothesis: primarily using the syntactic structure to get to meaning

Braginsky, Yurovsky, Marchman, & Frank 2016: While concreteness tends to predict the age of acquisition for nouns, knowledge of linguistic structure is a good predictor for function words like *how*, *why*, and *his*. This is true across seven different languages (English, Italian, Norwegian, Russian, Spanish, Swedish, Turkish) from the Wordbank database.

<http://wordbank.stanford.edu>

Wordbank

An open database of children's vocabulary development



# Knowing what to guess

Syntactic Bootstrapping Hypothesis: primarily using the syntactic structure to get to meaning

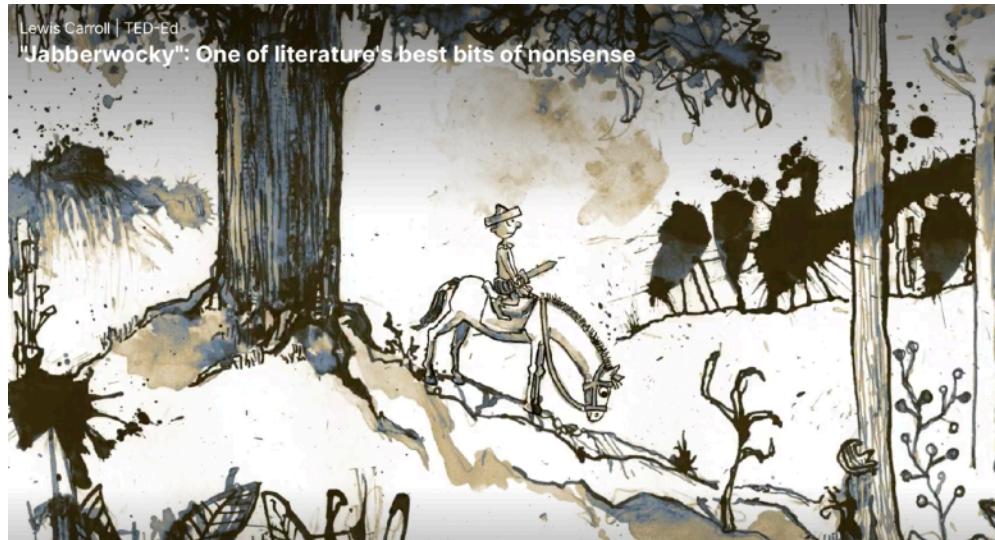
Abend, Kwiatkowski, Smith, Goldwater, & Steedman 2017: Syntactic bootstrapping may also play a part in children's **early noun bias**. The **relevant linguistic context for nouns is actually learned earlier than the relevant linguistic context for verbs**. This means nouns, in addition to being easier to pick up from the referential context (like scene information), are easier to pick up from the linguistic context.



# Getting a sense of how a child might feel

*Jabberwocky*, by Lewis Carroll

Twas brillig, and the slithy toves  
Did gyre and gimble in the wabe:  
All mimsy were the borogoves,  
And the mome raths outgrabe



<https://www.ted.com/talks/>

[lewis carroll jabberwocky one of literature s best bits of nonsense?  
utm\\_campaign=tedspread&utm\\_medium=referral&utm\\_source=tedcomshare](https://www.ted.com/talks/lewis_carroll_jabberwocky_one_of_literature_s_best_bits_of_nonsense?utm_campaign=tedspread&utm_medium=referral&utm_source=tedcomshare)

# Getting a sense of how a child might feel

*Jabberwocky*, by Lewis Carroll

Twas **brillig**, and the **slithy toves**  
Did **gyre** and **gimble** in the **wabe**:  
All **mimsy** were the **borogoves**,  
And the **mome raths** **outgrabe**

adjectives

*properties*

nouns

*things  
stuff*

verbs

*actions*



<https://www.ted.com/talks/>

lewis carroll jabberwocky one of literature s best bits of nonsense?  
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# Getting a sense of how a child might feel

From *But n Ben A-Go-Go*, Matthew Fitt (2000), p.85

But his *hert cawed him on*. He *nou* had the information he had been tryin tae *jalousie* on his *ain aw* these years. Or pairt o it *onywey*. A *whusper*. A *hauf* truth. *An* the time had come tae mak siccarr. He would meet with Broon an tak *fae* him *whit wis* needed.

Some contextual clues available (syntactic bootstrapping + known words).

# Getting a sense of how a child might feel

From *But n Ben A-Go-Go*, Matthew Fitt (2000), p.85

But his heart called him on. He now had the information he had been trying to jalouse on his ain all these years. Or part of it anyway. A whisper. A half truth. And the time had come to make siccar. He would meet with Broon and take fae him what was needed.

Add in knowledge of “near-words” that sound close to recognizable words.  
Remaining: jalouse, ain, siccar, fae?

# Getting a sense of how a child might feel

From *But n Ben A-Go-Go*, Matthew Fitt (2000), p.85

But his heart called him on. He now had the information he had been trying to jalouse on his own all these years. Or part of it anyway. A whisper. A half truth. And the time had come to make siccar. He would meet with Broon and take from him what was needed.

Guess common words by their position in the sentence  
(syntactic bootstrapping).

Still remaining: jalouse, siccar?

What are your guesses as to what these words mean? Why?

# Lexical acquisition recap

Children have to figure out what concept a word refers to. Children may be able to figure out verbs by relying more on the linguistic context, including words and structures they already recognize. This is sometimes called the “syntactic bootstrapping hypothesis”.

There is a lot of evidence that young children learn to rely quickly on linguistic cues more than other types of cues (social, visual, etc.)



# Questions?



You should be able to do up through 18 on HW4 and up through 28 on the review questions for lexical and morphological acquisition.