Psych 156A/ Ling 150: Psychology of Language Learning

Lecture 7

Sounds of Words II

Announcements

Quiz 2 results: Good! Avg: 9.8 out of 11

Homework 2 due today

Homework 3 assigned today, due next Tuesday (4/29/08)

Quiz 3 on Thursday (4/24/08)

In-class assignment today

Note for people who have added the class late: missing HWs and quizzes? (See me/Email me)

In-Class Assignment

Contributing to linguistic research: adult knowledge state (Tayopa)

The Child Word Learner

Perceptual system plays a significant role: perceptual units change throughout word learning - the more specific information the child has about the phonemes of the language, the more learning of words is facilitated.

Important ability: "bootstrapping"

= using existing knowledge to facilitate acquisition

(use existing perceptual knowledge to learn words)

Timeline of Word Form Learning

Discrimination of novel word forms

Phonetic sensitivity at 8-9 months

Stager & Werker 1997: bih/dih

Jusczyk & Aslin 1995: cup/tup

Emotional affect distinguishes words at 9 months

Singh et al. 2004: *cup* (happy) vs. cup (normal)

Speaker identity distinguishes words at 9 months

Houston & Jusczyk 2003: cup (speaker 1) vs. cup (speaker 2)

Timeline of Word Form Learning

Discrimination of novel word forms

10-12 months: Use of phonetic information to distinguish words depends on perceptual salience

Task is easier when critical phonemic detail is emphasized (stress)

Vihman et al 2004:

DInner vs. DIdder X

DInner vs. NInner √

Timeline of Word Form Learning

Discrimination of novel word forms

10-12 months: Use of phonetic information to distinguish words depends on perceptual salience

Task is easier when critical phonemic detail is emphasized (stress)

Halle & de Boysson-Bardies 1996:

bonJOUR vs. ponJOUR X

bonJOUR vs. ponGOUR √

Timeline of Word Form Learning

Discrimination of novel word forms

10-12 months: Use of phonetic information to distinguish words depends on perceptual salience

Task is easier when critical phonemic detail is emphasized (word-initial)

Swingley 2005:

paart (horse) vs. paarp X

paart (horse) vs. daart √

Timeline of Word Form Learning

Word-object pairings

14 months: Can learn novel pairings, but not if phonetically similar (Stager & Werker 1997)…unless the task is made easier

Fennell & Werker 2003: word forms are familiar

ball vs. doll √

Ballem & Plunkett 2005: preferential looking task (instead of switch task)

tuk vs. duk √

Timeline of Word Form Learning

Word-object pairings

17 months: Can learn novel pairings, even if phonetically similar and task is not made easier

Pater et al. 2004: pin vs. din √

Werker et al. 2002: bih vs. dih √

Children's Brains

Another look at children's knowledge

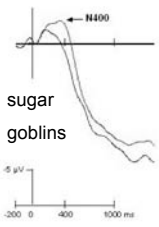
Neurological Data: Brain Activity at 14 months

N400 effect in adults: An event-related potential (ERP) component typically elicited by unexpected linguistic stimuli

I like my coffee with cream and…

sugar

goblins



Another look at children's knowledge

Neurological Data: Brain Activity at 14 months

N400-like effect in 14 month olds when hearing an incongruous (mispronounced) familiar word paired with a familiar picture (Friedrich & Friederici 2005)

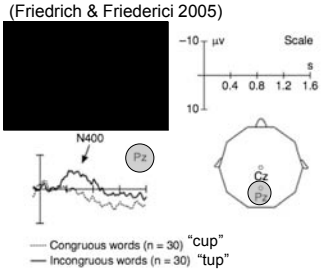
Familiar word: "cup"

Incongruous word: "tup"

Another look at children's knowledge

Neurological Data: Brain Activity at 14 months

N400-like effect in 14 month olds when hearing an incongruous (mispronounced) familiar word paired with a familiar picture (Friedrich & Friederici 2005)

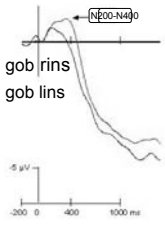


The child's brain responds as if the child has detailed phonetic information stored about familiar words.

Another look at children's knowledge

Neurological Data: Brain Activity at 14 months

N200-N400 effect in adults: An event-related potential (ERP) component typically elicited by word recognition



Another look at children's knowledge

Neurological Data: Brain Activity at 14 months

Mills et al. 2004: auditory presentation of word

(no picture)

"cup"

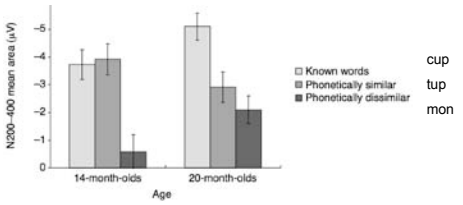
"tup"

Known words	Phonetically similar	Phonetically dissimilar
cup	tup	mon
bear	gare	kobe
nose	mose	jud
dog	bog	riss

Another look at children's knowledge

Neurological Data: Brain Activity at 14 months

Mills et al. 2004: auditory presentation of word



cup

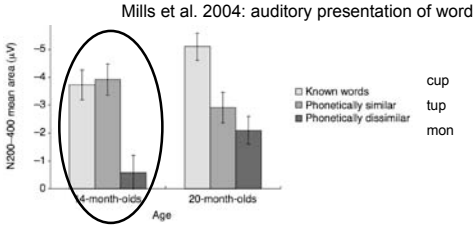
tup

mon

Another look at children's knowledge

Neurological Data: Brain Activity at 14 months

Mills et al. 2004: auditory presentation of word



cup

tup

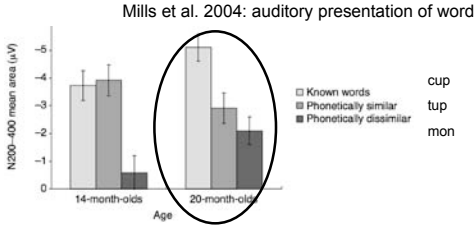
mon

14 months: brains respond as if they don't notice the difference in phonetic detail (cup = tup response)

Another look at children's knowledge

Neurological Data: Brain Activity at 14 months

Mills et al. 2004: auditory presentation of word



cup
tup
mon

20 months: brains respond as if they do notice the difference in phonetic detail (cup ≠ tup response)

Another look at children's knowledge

Neurological Data: Brain Activity at 14 months - why the difference?

N400-like effect when hearing an incongruous (mispronounced) familiar word paired with a familiar picture

(Friedrich & Friederici 2005)

No noticeable distinction between correct and mispronounced familiar words with auditory presentation of word alone

(Mills et al. 2004)

Speculation: Difference because recognizing the word form alone without link to real world object (meaning) is harder?

Question: Do infants need the whole word to recognize it, or can they recognize it from partial information?

Whole word: "baby"
Partial information: "ba.."

Adults can do this (incremental processing of a word).

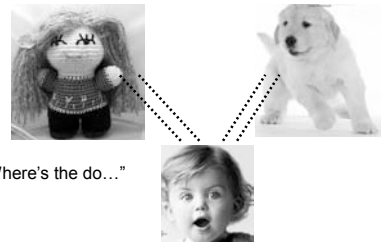
We can test when children can do this by seeing if infants can recognize a word (and its meaning/referent in the world) before they hear the whole word.

Incremental Processing of Word Forms

Swingley et al. 1999

Eyetracking with 2 year olds

doll dog



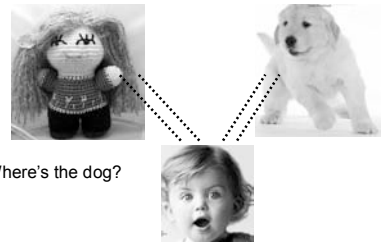
"Where's the do…"

Incremental Processing of Word Forms

Swingley et al. 1999

Eyetracking with 2 year olds

doll dog



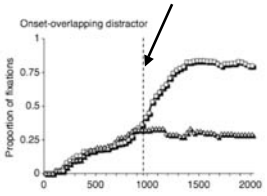
"Where's the dog?

Incremental Processing of Word Forms

Swingley et al. 1999

Eyetracking with 2 year olds: with onset-overlapping distractor (doll)

Looks to dog increase after crucial informative sound "g"

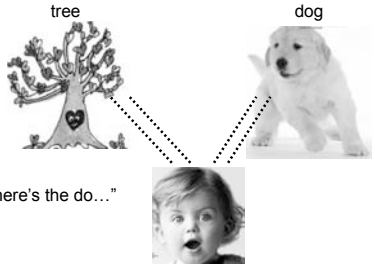


Incremental Processing of Word Forms

Swingley et al. 1999

Eyetracking with 2 year olds

tree dog



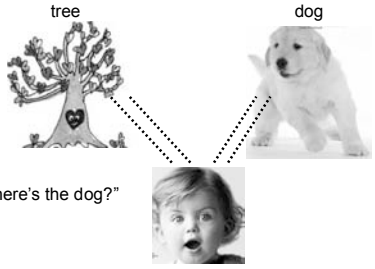
"Where's the do…"

Incremental Processing of Word Forms

Swingley et al. 1999

Eyetracking with 2 year olds

tree dog



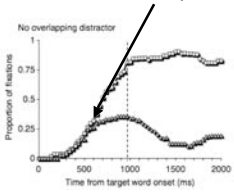
"Where's the dog?"

Incremental Processing of Word Forms

Swingley et al. 1999

Eyetracking with 2 year olds: with non-overlapping distractor (tree)

Looks to dog increase as soon as initial part of word is recognized



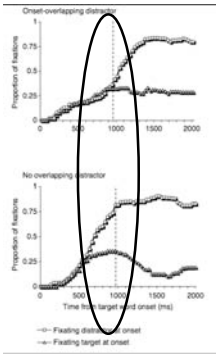
Incremental Processing of Word Forms

Swingley et al. 1999

Eyetracking with 2 year olds

2 years olds process words as the sound information is available - they don't have to wait till the end of the word to recognize it. This is how adults process language, too.

Time course: 2 yrs until incremental processing



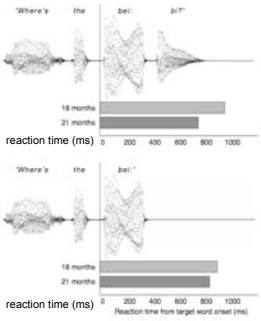
Incremental Processing of Word Forms

Swingley et al. 1999

Eyetracking

with 18 & 21 month olds

Evidence for incremental processing even at this age.



Incremental Processing of Word Forms

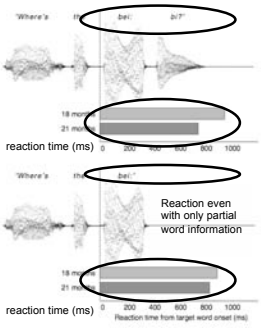
Swingley et al. 1999

Eyetracking

with 18 & 21 month olds

Evidence for incremental processing even at this age: even if infants only get first part of the word, they shift their attention to the appropriate referent in the world (ex: the baby).

Equally fast reaction times for whole word vs. part-word reaction.



Incremental Processing of Word Forms

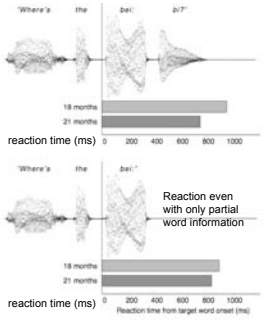
Swingley et al. 1999

Eyetracking

with 18 & 21 month olds

Evidence for incremental processing even at this age..

Time course: By 18 months old, children process words incrementally, just like adults.



Questions on Homework/Quizzes?