

PSYCH320: Study Guide Test 1

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1 Intro

What are the different levels of language?

- Syntax (grammar)
- Morphology (grammar)
- Lexicon (words)
- Phonology (sounds)

What are some reasons why language does not seem to be learned through only imitation and reinforcement?

- Children learn too fast
- Children produce (and understand) sentences they have never heard
- Speech is too messy
- There isn't much reinforcement

2 Perception

What kinds of things do native speakers know about the phonology of their language?

How do we describe the sounds of language? What are the important dimensions along which we organize speech sounds? What is VOT?

- Place of articulation: where you form a constriction
 - Lips (e.g. p, b, f)
 - Roof of mouth (e.g. t, s, d)
 - Back of mouth (e.g. h, k, g)
- Manner of articulation: how much constriction you form; are you stopping the air completely or are you letting it go through?
 - Complete (e.g. p, t, k)
 - Partial (e.g. s, f, z)
 - Very little (e.g. w, y)
- Voicing: when the vocal chords vibrate
 - “pa” vs. “ba”
 - Voice onset time (VOT): vocal chords start vibrating sooner for “ba” than “pa”

**What do infants know about speech sounds and the sounds of language at birth?
What experimental evidence do we have about this?**

- Newborns show equal preference for mammalian sounds (human speech and rhesus monkey calls) over synthetic sounds.
 - High Amplitude Sucking (HAS) experiments
- Prefer mom's voice to a stranger's 24 hours *after* birth and 2 weeks *before* birth.
 - 2 min silence, 2 min mom's voice, 2 min silence
 - 2 min silence, 2 min female stranger's voice, 2 min silence
 - Heart rate increased for mother's voice only
- "The Cat in the Hat" study
 - Pregnant women read a story aloud twice a day during last 6 weeks of pregnancy
 - Infants suck harder to hear the story they had heard in the womb (even when read by someone else's mother)
 - Most likely that babies are remembering the prosody of the language (hence the use of nursery rhymes).
- Newborns can discriminate languages from different rhythmic classes
 - French newborns can discriminate French and Russian
 - English newborns can discriminate English and Italian
 - Same results when language stimuli are low-pass filtered (don't need segmental or phonotactic information, only prosodic information)

What changes do we see in speech perception over the first year, and what are some possible explanations?

- By 3 months, babies show a preference for human speech over rhesus monkey calls.
- *Worsening* ability to discriminate speech sounds that are not meaningful in native language and *improved* ability for speech sounds that are meaningful in native language. This is called **perceptual narrowing**.
- Learn the phonotactic regularities of language.

What does it mean to track statistics of sounds or syllables? Infants learn what speech sounds differences to pay attention to (different phones or syllables) by tracking the distribution of the sounds they hear. Sounds with VOT that are heard most frequently must be different phones. Infants can categorize sounds without paying attention to meaning.

Old theory: Infants learn which sounds are different phonemes by learning that **minimal word pairs** like "big" and "pig" mean different things. However, babies can perceive the differences in sounds before understanding meaning.

What is infant-directed speech?

- Special register used for speaking to babies
- Higher pitch, exaggerated pitch contour, slower tempo, repetition, more extreme vowels
- Parents prioritize affect over grammar in sign language (sometimes angry/unpleasant facial expressions are part of the grammar)
- Infants are very sensitive to prosodic information and prefer IDS. Why?
 - Expression of emotion
 - Speaker appears less threatening

What is categorical perception and why is it important? Do infants have categorical perception? How do we know? Adults judge speech sounds on one side of the boundary as the same and sounds across the boundary as different even though the amount of acoustic difference (change in VOT) is the same in each trial. In particular, categorical perception pertains to the differences in voicing of consonants.

A study using HAS with 1 to 4 month olds showed increasing sucking for change in VOT across boundary for “pa” and “ba” and minimal increased sucking for changes not across the boundary. This is evidence that infants also have categorical perception.

3 Production

How does babbling change over the first year?

1. Reflexive crying and vegetative sounds (e.g. breathing).
2. Cooin (elicited by social interaction) begins at **2 months**
 - Mostly long drawn out vowel sounds
3. Vocal play/expansion at **4 to 7 months**
 - Produce back of mouth sounds (e.g. k, g) before front of mouth sounds (e.g. m, b)
 - Includes vowels and consonants
4. Reduplicated/canonical babbling at **6 to 9 months**
 - repetitions of string syllables (e.g. “dadadadada”)
 - The baby is practicing hearing themselves produce the sounds; babbling has no meaning whatsoever.
 - This might be why many languages have words like “mama” and “dad”.
5. Variegated babbling at **10 to 14 months**

- This is why babies add in prosody to their speech; the melody sounds like English but there are no identifiable words.

6. Protoword period at **10 to 14 months**

- Kids invent their own words (that don't resemble any real word) with consistent meanings.
- First words have simple structure (e.g. "bottle" = "baba")

What are the factors that influence babbling?

- Biological programming
 - Ranges of progression development (e.g. 6 months for babbling drift) are consistent across languages.
 - Back-to-front progression of sounds consistent across languages.
 - Deaf babies also babble orally.
- Experience
 - Deaf infants babble with their hands more than orally, especially when exposed to sign language.
 - Baby has to practice how to make the equivalent sounds with their own vocal tract to what they are hearing.
- Social interactions
 - In one study, babies increased vocalizations and vocalizations became more speech-like after contingent social interaction.

Why do young children's productions of words sound different from adults'?

- **Perception difficulties?**
 - Perception often precedes production since a child will not accept the mispronounced version of a word produced by an adult.
 - 14-, 18-, and 23-month olds are very sensitive to mispronunciations. "Where's the baby" vs. "Where's the paby".
- **Motor difficulties?**
 - Kids pick the closest related sound they can produce.
 - Glides substituted for liquids (e.g. "wabbit" for "rabbit")

What are phonological processes? What are some common processes in children's word productions? Phonological processes are patterns of sound errors produced by children because certain sounds are harder to produce so they replace them with the next most similar sound.

- cluster reduction
- reduplication
- deletion of final consonants
- and more (see worksheet)

4 Word Meanings

What is the task of word segmentation? What experimental evidence do we have about this? Before you know any words, how do you know where one word starts and ends and the next word begins?

The segmentation problem happens all the time to adults when listening to song lyrics. You might be surprised to learn that lyrics are different than you thought you heard when you see them written out.

In one study infants were familiarized to a passage containing dog and cup and later showed a preference for listening to dog, cup words at test than unfamiliar words. This occurs at **7.5 months** but not **6 months**. In another study infants listened longer to their own name than matched foils (name recognition occurs at **4.5 months**).

What are some ways that infants can solve the task of word segmentation?

- Hearing words in isolation (e.g. babies learn their own name by hearing it in isolation)
- Frequency of syllables appearing together in speech; syllables inside words are more likely to occur together than syllables from different words. The probability that a syllable will come next given a syllable is called **transitional probability**.
- IDS
- Stress patterns
- Phonotactics

What are words and why is word learning such a hard problem? Words are strings of speech sounds referring to concepts.

- Finding and storing individual words in a string of speech sounds (segmentation problem).
- Figuring out what people are referring to when they say a word (gavagai problem).
- Mapping words onto referents

What are the various lexical biases that children bring to the word learning task? What experimental evidence tells us about these biases?

- Whole-object assumption
 - Nouns refer to whole objects so a kid won't pick the image that only has the same property as the image of a noun.
 - A good label will refer to the whole object and not its parts or properties.
- Mutual exclusivity
 - Kids assume that objects can't have more than one label.
 - If given a choice of 3 objects and a kid knows the words for two of them, they will associate a new word with the third object.
- Taxonomic assumption
 - We only have words for taxonomic categories and not thematic categories.
 - Kids seem to know that a word can only be applied to a category and not a theme.

What other types of information might children rely on to learn about word meanings? What experimental evidence do we have about this?

- Pragmatic assumptions
 - A kid would assume that their conversation partner would use words that they know so if the speaker uses a word the kid doesn't know then the kid assumes they are talking about a new object. This is not the same assumption as mutual exclusivity!
 - 18 month olds map words onto objects the speaker is looking at instead of what they themselves are looking at
- Cross-situational statistics
 - At 12 months, kids can identify words that keep appearing in the same context as the referent.
 - e.g. If you hear "Gavagai" and see a rabbit at the same time more than once, you will assume that "Gavagai" means rabbit.
- Language environment
 - Speech directed to children is about hear and now. You don't talk to kids about what is happening in 3 months, you talk about things that are in their environment right now.
 - Parents often comment on things or objects a child is already interested in or holding.
- Language cues
 - Noun-like words tell a kid they should focus on the object
 - Verb-like words tell a kid they should focus on the behaviour of an object.
 - This only happens after 12 months.

5 Word Learning

What is fast mapping?

- Learning a concept based on a single exposure.
- In one study 13 month olds were asked “Can you bring me the *chromium* tray”? Kids decided pretty quickly that *chromium* was a color and not some other property of the tray.
- Fast mapping does not equal complete understanding. Kids didn’t remember what *chromium* meant when tested later.

What words are more common in early vocabularies? Why might this be?

Nouns are more common in early vocabularies because a kid can see the object in their immediate environment. Picturable words are easier to learn through observation. More concrete verbs are acquired earlier (e.g. kiss).

What is the word spurt? The jump in the number of words in a kid’s vocabulary that occurs at 18 months.

What are some sources of individual differences in vocabulary development?

- Types of words
 - Kids might be more interested in objects (nouns) or people (social words).
 - The parent might be using more nouns when talking to their kid.
- Rate
 - Kids who talk more get more input since they have more conversations
- Environment
 - Kids in families with higher SES get richer input.
 - Adults attentiveness to state of child.
- IDS

6 Studies

6.1 Do infants have categorical perception?

Design

Result

6.2 Can infants track the statistical distribution of sounds?

Design

- 6 to 8 month old infants

Result

6.3 Learning about phonotactics

- 9 months old but not 6 months old listened longer to the list with more common phonotactics of native language.

6.4 Role of social interaction in speech production