What we learn when we learn a language

Phonological development—knowledge of a language sound system
- Phonology—System of sounds a language uses.
  - Phonemes are the smallest units of sound that affect meaning (e.g., Cat vs. Bat)
  - 200 possible phonemes in all languages—English—about 45
- Morphology—Study of rules of how words are formed from sounds.
  - Plurals are formed by adding “s” sound, dog → dogs

Semantics—How meaning is expressed in language
- Morpheme is smallest unit of sound that conveys a specific meaning.
  - Free morphemes—stand alone words “dog”, “cat”, “walk”
  - Bound morphemes—cannot stand alone, change meaning of free morphemes. Although “s” cannot stand alone it gives added meaning.

Grammar
- Syntax—the system of rules for arranging words into sentences that have meaning.
  - Some grammatical rules pertain to order, which gives different meaning (e.g., John kissed Mary vs. Kissed Mary John)

Pragmatics—Principles governing how language is used in different situations.
- You may speak differently to your profs than you do to friends.

Theories of Language Acquisition

Behaviorism’s linear model
- Stimulus → Response → Stimulus → Response → Stimulus → etc.
  - Hunger “I” “want” “cookie”
- Skinner’s model is linear going from left to right
  - ”I want _______” (Sentence frame for interchanging words to produce multiple sentences).
- Skinner believed Words develop transitional probabilities of occurrence between each other. Words that are often used together call forth each other.

Inherent Problems for Left to Right Models

Behaviorist models based upon the idea that the transitional probabilities between words carry meaning, but also problems:
- “The millwright, on my right, thinks it right, that some conventional rite, should symbolize the right, of every person to write as they please.”
- Or
  - “Rapid righting with his uninjured hand, he saved the contents from capsized canoe.”
- Or the case where probabilities are zero.
  - “Colorless green ideas sleep furiously”

Noam Chomsky’s criticism
- A behaviorist model will not work because it relies on surface structure of a language for its explanation.
  - Distinguished Surface Structure (the actual words we use), from Deep structure (the underlying meaning of what is said).
- There is only one meaning based on on surface structure, yet there are many sentences in our language that can be interpreted more than one way in the deep structure.
  - Ambiguous sentences, more than one meaning (deep structure)
    - They are visiting firemen
    - I like her cooking
    - The dean was ordered to stop drinking after midnight
  - Active and passive sentences, one meaning two surface structures The book was read by the boy vs. The boy read the book

Skinner’s Explanation of Language

Skinner assumed that language developed in children because their parents reinforce them.
- Reinforcement—adults reward children for correct usage.
  - When a child uses a grammatically correct utterance he or she is given a reinforcement signaling that they have spoken appropriately.
- Imitation
  - More advanced language structures that the child did not produce spontaneously was learned through imitation. The child hears the utterance and copies it and parents reinforce them for doing so.
Problems with imitation and reinforcement

Parents reinforce their children truth of statements rather than for for correct grammar

- Child: Mama isn’t a boy, he a girl.
- Mother: That’s right.
- Child: And Walt Disney comes on Tuesday.
- Mother: No, he does not.

Difficulties for the Behaviorist Model

Problems:

- Little evidence of parents reinforcing correct grammar consistently
- Children show little imitation of advanced grammar, instead the modify it to fit their level of competence
- Cannot explain the novelty of language using a model that is based on habit. Kids don’t use the same sentence often enough to reinforce it regularly.
- Cannot explain consistencies across cultures. Why do children appear to learn the same types of grammatical rules in the same order?
- The speech a child hears is limited in amount and fragmentary and yet children can easily communicate with other children who have a similar experience.

Nativist Model of Language Acquisition

Chomsky’s Nativist Perspective

- Humans come with a built-in model of the basic structure of human language LAD that allows the child to develop an implicit theory for any language.

The Nativist Position

Language is only possible with a human brain!

- Brains are specialized for language, Broca and Wernicke areas
- Infants show greater left brain activity when listening to speech, but right brain to other sounds
- Language only marginally dependent on intelligence
- Sensitive periods for learning a language
- Ascents
- Differences in learning a language early or later in life

Problems with imitation and reinforcement

Children show little imitation of more advanced grammatical structure

- Child: Nobody don’t like me.
- Mother: No, say "Nobody likes me."
- Child: Nobody don't like me.
- Mother: No, say "Nobody likes me."
- Child: Nobody don't like me. (seven more repetitions of this same interchange)
- Mother: No, now listen carefully: "Nobody likes me."
- Child: Oh!! Nobody don't LIKES me.

Note the child doesn’t imitate but translates the utterance into one at their own level.
Also, the form the child uses is its own creation not one that was copied from an adult.

Language Performance of Korean and Chinese Immigrants

Mean Score

<table>
<thead>
<tr>
<th>Age at Arrival</th>
<th>Native 3 to 7</th>
<th>8 to 10</th>
<th>11 to 15</th>
<th>17 to 39</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>270</td>
<td>260</td>
<td>250</td>
<td>240</td>
</tr>
</tbody>
</table>

- English
Can Apes learn a language?

Early attempts-Hayes, Kellogg
Gardner’s Washoe, Rumbaugh’s Kanzi

A language is:
- symbolic - words arbitrarily represent something else
- semantic - words have meaning
- generative - words can be combined to create meaning
- structured (rule governed) - the way words are combined determines meaning

Apes can use symbols and communicate their thoughts, but no evidence for the ability to use syntax to convey meaning, or creating new utterances by combining words in novel ways.

Nativist position on language

The case of “Genie”
- Virtually everything of syntax lacking, no auxiliaries, no reordering, no question words, no pronouns
- Right hemisphere dominant for all listening functions

Problems with Nativist Perspective

Nativist Perspective:
- To merely assert that language the result of a biological predisposition tells us little about how language is learned.
- If all children possess a universal LAD why is there so much diversity in the grammatical features of languages.

The Interactionist Perspective

Interactionist perspective:
- Biological and Cognitive influences contribute to learning a language.
  - The Nervous System gradually matures creating the foundation for the cognitive changes we see in development.
  - Children are similar in the language milestones across cultures, because brain maturation creates the cognitive foundation that makes those milestones possible.
- Learning a language requires children who are biologically prepared to learn it AND a responsive linguistic environment to support it.

Interactionist Perspective

One of the differences in the Interactionist position is the emphasis on support for
- Turn taking
  - Games like “peek a boo”
  - Reading stories and asking question or waiting for a response

Figure 10.4: An overview of the interactionist perspective on language development.
Support of Language Learning

Child-Directed Speech or Motherese: Parents modify their speech when talking with children.
- Presented slower, with higher pitch, with key words emphasized. Positive emotional tone, with extreme changes in intonation pattern.
- Use of short, well formed, simple sentences
- Vocabulary and syntax presented at a level a little bit above the child’s own speech.
- Children show preference for motherese.
- Adults use motherese but so do children.
  - Four-year-olds were asked to describe toy to an adult and a younger two-year-old child. Used shorter utterances, simple constructions, repeated themselves more and employed more attention getting devices (Shatz & Gelman, 1973).

Support of Language Learning

Recasts
- Rather than repeating the intent of the child’s utterance, the adult offers a semantically related, but extended grammatical utterance. Both correcting and guiding child to more grammatically complex form.
  - Child: "Doggie go."
  - Parent: "That doggie lives down the street."
  - Child: "Me cookie?"
  - Parent: "Grandma made them for desert."
And as was the case with Motherese, Children learn language more quickly with expansions and recasts.

Support of Language Learning

Children whose parents use Infant-Directed-Talk show more advanced linguistic abilities
As children grow older the support is related to more complex grammatical forms
Grammatical Expansions
- Parent imitates and expands or adds to child statement. Provides a grammatically correct and enriched version of child speech. He
  - Child: "Doggie go."
  - Parent: "Yes, the doggie is going for a walk."
  - Child: "Me cookie?"
  - Parent: "You would would like a cookie?"

Support of Language Learning

However "how" parents talk with their children also matters.
- Parents who use many directives to control children and who are intrusive slow progress.
- Progress best when using questions and conversational turn taking to elicit child speech.

How Important Are Parental Aids?

Problems:
- The Kaluli of New Guinea and American Somoa adults don’t use motherese, speak to children as though they are adults, yet child learns language effortlessly.
- So far although these recasts and expansions may be helpful they have not been found to be necessary for child to learn language

Conclusion:
- Although Motherese, Expansions and recasts may affect speed of early language learning, it does not seem to affect the child’s eventual mastery of language.

So what is needed?

Well, a responsive environment is critical.
- No child has ever learned a language by watching TV, need responsive environment
It appears that the main ingredient in learning a language is to attempt meaningful communication with those around you.
Steps in Learning a Language

Newborns show an interest in human speech and treat it differently.
- Prefer language sounds to other sounds
- Recognizes mother’s voice by end of second week
- Infants perceive speech sounds as belonging to discrete phonemic categories e.g., /pah/ vs /bah/.
- This is known as categorical speech perception. Do not perceive speech sounds as changing on an acoustic continuum, but abruptly switching from the perception of one sound to the other.

Steps in Learning a Language

- Infants actually recognize more phonemes than adult speakers. They distinguish the phonemic differences in all languages of the world. They are ready to start learning any possible language.
- Adult speakers often have trouble hearing the phonemic distinctions made in other languages. Japanese difficulty in L & R. "Which way to Times Square?" "Turn left after the next light."
- Similarly we find that the ability to recognize differences in phonemes not used in their language is lost by 12 months. Janet Werker.
- For some infants this begins as early as seven months and correlated with better vocabulary and grammar between 14 and 30 months, and greater difficulty in learning new language phonemes.

Steps in Speaking a Language

Janet Werker

Two months
- Children produce one syllable vowel sounds known as cooing e.g. "oooooh", "eeeee." begin to realize the effect vocalizations have on adults.

Four to Six months
- Children produce consonant vowel combinations, "dada" known as babbling.
- Based on biological maturation. However, Congenitally deaf infants babble late but their babbling is limited.
- Deaf infants exposed to ASL babble manually at 8 months.
Steps in Speaking a Language

Seven to Eight months
- babbling sounds gravitate toward their own language.
- At 8 months, native speakers recognize babbling of infants who "speak" their language.

Nine to fourteen months
- "Patterned Speech". Children pick up pacing, intonation and rhythm of their language, sounds like they are speaking their own language.

Twins talking

Antecedents of Language Development

Prelinguistic - Not able to use words but attempts communication preparing the way for later language learning.
- Pseudodialogs – as early as 3 months, child and parent engage in vocal turn taking, likely to be encouraged by games such as "peekaboo."
- Gestures may be specific to referent, e.g., child who sniffs when pointing to flower or waves hands when pointing at butterfly. Usually precedes words by a few weeks (Acredolo & Goodwyn, 1988).
- Protodeclarative – end of first year, points to something while looking at others to draw their attention to what they see.
- Protoimperative - getting someone to do something by gestures.
- Use of intonation patterns to express meaning, such as a question or declaration.

Child’s First Words

First word at about a year
Early productive vocabulary:
- American parents do a lot of object naming.
- Nouns predominate first words, such as words for objects ("blanky"), people ("dada"), or events ("night-night"). More abstract words, like verbs take longer, since they express a relation between objects.
- Fast Mapping. Learning vocabulary explodes around 18 months, about 13 words a week. 14,800 words by the start of school.
- Wide individual differences when children begin to talk.

Principle of comprehension before production
- Child able to understand words used by others before being able to use the words by themselves.
- In early learning of words, overextensions more common than underextensions e.g., dog for all animals. Child understands the difference but overextends intentionally to get more use out of their limited vocabulary.

Parents who talk with their children a lot have children with large vocabularies.

Production lags behind comprehension
**The Reference Problem**

When a word is used how does the child know what it is referring to: Whole object? Part of the object? What the object is doing? An attribute of an object (e.g., color, size).

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**Children’s Biases in Learning Words**

Child is given a novel object and the parent says “doll.”
- Whole-object assumption—name refers to whole object not part.

Child is given two toys, one of which she has a name for the other she doesn’t. Parent says give me the “gisa.”
- Mutual exclusivity assumption—unnamed object is given novel name.

Cues in conversational settings: Parent asks where is the “daxil?” and smiles as she picks up a particular object.
- Intentionality

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**Naming biases**

**Snytactic Bootstrapping**
- The discovery of meaning by using the syntactic context in which the new word appears.
- “Now hand me the puce car.”
  - Child is given a new word that appears before a familiar object, comes to realize that the new word describes a property of that object.

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**Holophrastic Speech and Two Words**

Single word utterances are call holophrastic speech because they express more complex thoughts or ideas, than the single word implies.

Two word utterances marks appearance of syntax (rules for combining words) in second year.
- Utterances are telegraphic, only crucial words, no articles, auxiliaries, or prepositions, “hurt knee,” “want milk,” “candy allgone.”
- Pivot Grammar—one word in fixed position while other words combined with it.
  - No bed, no home, no toy
  - Shoe off, light off, water off
  - More candy, more hot, more read, more walk
  - All gone juice, all gone boy, all gone dog

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**Evidence of Grammatical Rules**

- Here is a **wug**. Now there are two. There are two

- Here is a **bix**. Now there are two. There are two

- Here is a **niss**. Now there are two. There are two

- Here is a man he knows how to **rick**. He **ricks** every day. Today he **ricks**. Yesterday he _____

- Here is a man he knows how to **sib**. He **sibs** every day. Today he **sibs**. Yesterday he _____

- Here is a man he knows how to **ging**. He **blings** every day. Today he **blings**. Yesterday he _____

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**Children Apply Rules to their Utterances**

**Berko’s Wug Study. Children 4-6**
- Here is a **wug**. Now there are two. There are two
- Here is a **bix**. Now there are two. There are two
- Here is a **niss**. Now there are two. There are two
- Here is a man he knows how to **rick**. He **ricks** every day. Today he **ricks**. Yesterday he _____
- Here is a man he knows how to **sib**. He **sibs** every day. Today he **sibs**. Yesterday he _____
- Here is a man he knows how to **ging**. He **blings** every day. Today he **blings**. Yesterday he _____
**Child’s Overregularization of Irregular Verbs**

**Overregularization of verbs**
- regular verbs = walk - walked
- irregular verbs = see – saw, hold–held

- Child: My Teacher holded the rabbits and we patted them.
- Mother: Did you say your teacher held the baby rabbits?
- Child: Yes.
- Mother: What did you say she did?
- Child: She holded the baby rabbits and we patted them.
- Mother: Did you say she held them tightly?
- Child: No, she holded them loosely.

**Overregularization gives added support to idea of children generating rules for language, not imitating parents.**