# Psycholinguistics
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# First Semester
# Lecture 7

# Language Acquisition

- **Developmental psycholinguistics** is the discipline devoted to the study of language acquisition by children. Developmental psycholinguistics have described the way in which children acquire language, which is in fact a quite orderly process that make language development possible, or, perhaps, inevitable.

# Research Methods in the Study of Language Development

- 1. **Diaries in Parental Reports:** The first studies, as early as the 18$^{th}$ century, were almost invariably based on observations of the author's own children and were kept in the form of diaries.

- 2. **Observational Data:** Developmental psycholinguists collect tape-recorded observational data on children's language and conduct experimental research based on children's abilities to produce and comprehend specific structures of English.

- Some of the landmark work in developmental psycholinguistics is based on small numbers of children who were intensively observed over a number of months or years. In the 1960s at Harvard University, Roger Brown headed a project that studied the language of three children who were called **Adam, Eve, and Sarah (Brown, 1973).** See bottom of page 349 for a full description of the study.

- By the mid-1980s, many finely detailed transcripts of early child language attempts had been compiled. The Child Language Data Exchange System (CHILDS) was developed to enable child language researchers to examine and pool language transcripts already in existence.

- Brown's transcripts are now available to the entire child language research community, and continue to provide data for current research questions.

- CHILDES collects data in many languages and on normally and in normally and atypically developing children.

- 3. **Experimental Techniques:** These techniques differ widely, from observation of the child's physiological response to stimuli (that is, looking or, heart-rate changes) to procedures that ask the child to supply words for pictures or activities or to point to pictures that match an auditory stimuli.

- **Research Design:**
- They can be either cross-sectional or longitudinal.
- **Longitudinal studies**- such as Brown' study- track development in the *same* subjects as they grow older and answer questions, such as those that deal with the effect of children's early linguistic environment on their later acquisition of language.

- **Cross-sectional** ask questions such as "How do 2-, 3-, and 4-year old children interpret passive sentences?". They gather groups of 2-, 3-, and 4-year-old children and assess their abilities on the task in question. They obtain a great deal of data in a short time, rather than over months or years. Studying many subjects also makes it more likely that study results can be generalized-rather than perhaps particularized to a small group of children. They include at least two groups of subjects, e.g. the speech of a group of 3-year-olds and a group of 4-year-olds could be compared for their use of tags.

## How Speech Perception Develops?

Infants can do the following:

1. Hear before they are born
2. Demonstrate a preference for their own mother's voices shortly after birth
3. Discriminate between utterances spoken in the mother's native language as opposed to a foreign language by about 4 days of age.
4. Perceive voice-onset-time much as adults
5. Utilize formant transition cues to discriminate sounds

6. Discriminate between male and female voices

7. Show an early preference for language that is broken into clausal chunks, rather than segmented randomly, which is a possible **bootstrapping strategy.**

8. Understand phonotactic regularities of their language

9. Distinguish between sounds, e.g. voiced and voiceless

10. Infants 8 to 10 months of age have the ability to discriminate phonemes that are not in the local language, where as the adults in the community cannot. This ability begins to disappear by the end of the first year, when the infant has begun to learn the sounds of the language around her. **Perceptual loss** is a consequence of the infant's continued interaction with her language. The infants begin to narrow their perception of sounds to those in their target native language before they even begin talking.

# The Child's Lexicon

- **Before First Words:**
- In the first year infants begin to demonstrate true intensions and to express them in a variety of prelinguistic ways. Researchers believe that these early attempts at communication include both **protodeclaratives** (language about something) and **protoimperatives** (requests that something be done for or given to the infant).

- **First Words:**

- Children begin to produce recognizable words of their language at about 1 year of age. By 18 to 20 months, they typically have acquired approximately 50 words, and by age 2, an average child knows 200-300 words. The dramatic increase in children's lexicons that typically follows the acquisition of the first 50 words is sometimes called the vocabulary **"spurt"**.

- Once language development is under way, researchers have noted regular patterns in the ways young children progress toward full adult competence. (See the work of Brown and his colleagues).

1. First words rarely contain consonant clusters and are more likely to consist of **open syllables** (a consonant followed by a vowel).

2. Early words serve important *functions* for the child, e.g. *"carpet"* is an unlikely candidate for first word, while *"more?"* may be produced with an adult-like questioning intonation contour and function as a reduced version of the adult request. This stage is called **holophrastic** to describe this use of single-word sentences.

3. At the earliest stage, children produce one meaningful concrete **content word** at a time, but certainly not a **function word** or an **abstract word.**

4. Early words are embedded in the child's environment or the "here and now".

5. Children do not make **referential use of language** until after they have learned their earliest words. That is, in their earliest word productions, they do not use language to refer to absent objects.

6. Children understand more than five times as many words as they actually produce, which also applies to children's acquisition of syntactic concepts.

7. The early lexicon tends to look quite "nouny" for many children learning English which reflects two things: The inherent conceptual and linguistic complexity of verbs when compared to nouns, particularly verbs that encode hidden states such as *think, see, feel,* or *want,* and the tendency for English-speaking parents to emphasize nouns when speaking to young children.

8. Children can use morphological inflections to predict whether words are nouns or verbs by age 2;6. They can also exploit knowledge of their grammar and lexical formation to coin new words, e.g. *brooming the floor.*

9. Early nouns tend to be exemplars of what have been called **basic level categories**, e.g. *dog* and *car* rather than subordinate members, e.g. *poodle* and *convertible* and superordinate terms, e.g. *animal* and *vehicle*. They also tend to be **concrete vocabulary** terms.

10. In their early use of words children do not assign adult-like meaning to these words. The meanings are characterized by either **overextension, underextension** or **mismatch.**

**11.** Children have trouble with the following words:

**a. Relative concepts,** e.g. *big,* for which they tend to give **absolute meaning** for the first few years.

**b. Kinship terms,** which are inherently relational. It takes children until age 7 or older to fully understand them.

**c. Ambiguous words,** which are not fully appreciated until the age of 8 to 10 years old, after which the develop interest in jokes and puns, however, they can not explain why the joke is funny.

12. Children have smaller lexicon than adults, yet take longer time to retrieve words due to much less efficient storage and access strategies.

13. Children organize the lexicon into networks. However, unlike adults, their responses to stimulus words appear to be **syntagmatic** rather than **paradigmatic.**

# Learning to make and understand sentences

○ **Methods of assessing syntactic knowledge:**

1. Observations in naturalistic settings.

2. Experimental tasks in which the researcher asks the child to complete a word or a phrase to see if the child understands certain grammatical concepts, e.g. The Wug Study, which is useful to determine whether or not a child understands how to create plurals, past tenses, or to derive parts of speech ("It has a lot of *lerbs* on it. It is very --------.").(**For other methods see pages 364 and 365).**

# Moving From Words to Sentences
## Early Grammar

- Some time during their second year, after children have about 50 words in their vocabulary, they begin to put them together into rudimentary **two-word sentences** with the following features:

1. They lack articles, prepositions, inflections, number, gender, tense, or any other grammatical modifications, which makes them more like **telegraphic speech** combinations, thus, limited in meaning.

2. At this stage, children everywhere in the world express the same kinds of thoughts and intentions in the same kinds of utterances (Brown, 1973)(see page 366).

3. Children learning languages other than English with richer systems of bound morphology, such as Turkish, use the morphological system relatively error-free by age 2. Another example comes from gender marking in Hebrew and French, page 367. In general, the emergence of grammar will be determined by numerous factors, including the **pervasiveness** and **regularity** of a language's grammatical constructions, the degree to which they **make semantic sense,** and the relative **salience** of the grammatical concept.

3. After children begin to learn the regular plurals such as *horses* and *skated*, they create some regularized forms of their own, such as *mouses* and *eated*. This is generally referred to as **overregularization,** and it is excellent evidence that children are learning the *systems* of their language: they are producing words according to the basic *rules* of the language, rather than by simple imitation of the language they hear.

- **Learning to Make sentences in English:**
- <u>Introductory remark</u>: Because English contains relatively few grammatical morphemes, but uses them in the vast majority of well-formed sentences, Brown and other researchers have found it useful to track language development by reference to a measure known as **mean length of utterance (MLU).** This measure calculates the average length of a child's utterance in *morphemes,* rather than words, and tend to define stages of early language development (for rules of calculating MLU, see pages 370, 371).

- For a review of the acquisition of different syntactic constructions see pages 369, 370, 371, 372, and 373.

- **Learning to Communicate: Early Social Uses of Language.**

- See pages 373, 374, and 375.
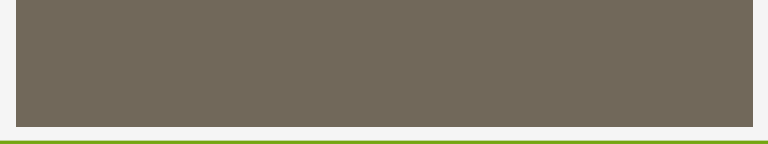
# Theories of Child Language Acquisition

- **What must theories of language development account for?**

1. Children learn language rapidly.

2. Across languages, some systematic regularities exist in what children learn both early and late, as well as some differences that require explanation.

3. The nature of children's mistakes, as well as their successes in early language use.

4. Why predictable sequences occur in children's language acquisition: why some learning occurs sooner, some later.

5. How children learn language, given the language input they receive from the adults in their environment.

# General Features of Theories

- At one extreme, scholars claim that language is a *learned behavior* that parents teach to children.

- At the other end researchers claim that principles that underlie language are *innate*, or present at birth as part of the child's biological heritage.

- Some scholars theorize that children acquire language by *imitating* the adults around them.

# Major Dimensions of Language Development Theories

1. **Nature or Nurture?** This is the major question that divides psycholinguists. To what extent is language *hardwired* into human brain (nature), and to what extent is it learned through interaction with the environment (nurture)?

2. **Continuity or Discontinuity?** Does language develop in a seamless flow, smoothly and with barely perceptible transitions, or does it proceed in stages that are clearly distinct from one another? For instance, does the infant's babbling slowly turn into words, or does babbling cease at one stage, followed by a stage at which talking begins?

3. **Universal Competence or Individual Variation?** Is linguistic competence basically *invariant*? Do all children acquire language in the same way? For instance, if we collect the first words and then the first sentences of 50 or 100 children learning English, will they be basically the same?

4. **Autonomy or Dependency?** Is language a separate faculty of the human mind? Or is language development dependent on-or a part of-other kinds of development?

5. **Rules or Associations?** Is the child who acquires language internalizing a set of abstract cognitive principles or is the child learning language without recourse to *rules*, but merely as a set of *connections* or associations built on past experience? For instance, when a child learns that the past tense of *melt* is *melted,* has he learned a *rule* for adding the ending or has he simply processed the statistical observation that words ending in /t/ tend to be followed by /∂d/ if they are conveying past-tense information?

# Linguistic/Innatist Theory

- Linguistic/innatist theorists believe that the principles of language are born and not learned.
- Three major concerns underlie this assumption:

1. Not all language overheard by children consists of complete, well-formed utterances.

2. Children come to use and understand sentences that presumably never occur in their language learning environment.

3. Children do not in syntax attempt to form certain ungrammatical constructions, a problem called ***negative evidence:*** no one ever tells them don't try doing the following things in English, they're not grammatical. Even when adults attempt to teach language, children fail to make use of that information. See page 379.

- Linguistic theorists rely heavily on theories of mind and on special abstract mental mechanisms such as a postulated *language acquisition device (LAD)* (Chomsky, 1965, 1972, 1982) to reconcile rapid, successful language acquisition with these deficiencies in data to which the child is exposed. The language acquisition device, according to Chomsky, makes it possible for children to *attend* to the language that the adults around them speak, *make hypotheses* about how it works, and *derive an appropriate grammar.*

- Innatist theory claims that many aspects of language development are *preprogrammed* in the individual and a child does not require explicit teaching or experience in order to acquire language.

- The language that infants hear provides data for their grammatical hypotheses, but the LAD does not require *specialized input* to do its job-any reasonable sample of language will do, according to the theory. Thus, nativists view language as a hardwired *bioprogram* that develops when the infant is exposed to language.

- The principles that underlie all possible human languages are considered innate and constitute the concept known as *Universal Grammar (UG).* Chomsky defines it as "the system of principles, conditions and rules that are elements or properties of all human languages not merely by accident but by biological necessity". Thus, acquiring language is rather like learning to walk-it happens in just about every intact individual, with or without explicit training.

- Of course, every child learns a particular language, and we must explain *how* children proceed from the initial state to competence in the language spoken in their community. According to the linguistic point of view, infants may be innately endowed with linguistic switches or *parameters* that they set once they hear the adult language around them. For instance, children may note that English is a subject-verb-object language, or that it has articles before its nouns and set their parameters accordingly.

In the linguistic view, language is *autonomous* faculty, separate from intelligence, that children are innately driven to acquire. The various subsystems of language are internalized as sets of algorithms or rules that allow the child to produce new utterances that she has never heard before. For instance, a child of 3 or 4 years can produce the plural of a nonsense word *gutch*, which she has never heard before, if shown pictures such as the ones in figure 8.6, page 381.

- If a child knows that the plural of *witch* is *witches* he may simply have memorized the plural form. If, however, he tells us that the plural of *gutch* is *gutches*, we have evidence that he actually knows, unconsciously, one of those rules that the descriptive linguist, too, would set forth in his grammar (Berko, 1958, p.47).

- Language acquisition involves internalizing the rules that underlie the various subsystems of the language. We can know one set of rules (the phonology, for instance) without knowing another set of rules (the inflectional system, for instence). In this sense linguistic knowledge is *modular*-the units are to a large degree independent of one another.

- Linguistic/innatest theory suggest the possibility of a *critical* or *sensitive period* during which the language acquisition device and parameter setting can optimally function. When the critical period has passed (usually when the individual reaches puberty) acquiring a first language may become difficult or even impossible.

# Learning Theory

- *Behaviorists,* or *Learning Theorists* (for example, skinner, 1957), claim that language is acquired according to the general laws of learning and is similar to any other learned behavior. Behaviorists see spoken-language development as a result of adults' reinforcement and gradual shaping of infants' babbling, and they apply the general principles of learning to later developments-for example, learning how to make a past tense of a new verb is a result of generalization based on past experience with similar words.

- **Learning Theory includes at least three kinds of learning:**

1. **Classical Conditioning:** An infant may learn the meaning of a word through classical conditioning using *stimulus*, e.g. the word "bottle" and *response*, e.g. the infant becomes physiologically prepared to drink. If every time the infant is fed, her mother holds up the bottle and says "bottle," the child begins to *associate* the word "bottle" with the object.

2. **Operant Conditioning:** The basic principle is that behavior that is rewarded-or *reinforced*-will be *strengthened*. Behavior that is not reinforced will become *extinguished*.

3. **Social Learning:** It takes place when the child *observes* and *imitates* others. The basic principle involved is that children need not be rewarded themselves in order to acquire a behavior-they also learn to behave like appropriate models.

However, learning theory models can not explain many aspects of children's language acquisition because children

1. Say things they have never heard before, such as, "I holded the baby rabbit".

2. Do not say some of the things they hear most commonly-for instance, infants' first utterances do not contain articles, even though *a* and *the* are the most common words in the English language.

# Connectionist Models

- *Connectionist* or *parallel distributed processing (PDP) models* explore how information may be built into a system (in this case the child's brain) through *neural connections*. They claim that activation of one concept in our minds has the capacity to bring up another.

- Human memory of experiences appears to be distributed widely across what may be termed *processing units*. These units are a little like idealized brain cells. They can perform only the same simple computation. The power of the system comes from how the units are connected. A child develops such connections over time through exposure to the forms of the language associated with external events

- For example, a child may hear the word ***bottle*** under varying circumstances and thereby establishes neural associations to the word, to the initial sound /b/, to the word ***milk***, and so forth. Ultimately those interconnected associations become the "meaning" of the word.

- (PDP) models have been used to describe how particular grammatical structures such as the inflectional system may be acquired (McClelland, Rumelhart, & PDP Group, 1986). They assume that sufficient exposure will lead to the establishment of neural network, and McClelland and his colleagues have somewhat successfully modeled in a computer how a child might acquire simple past tense in English.

- In doing so, the "processor" (child or machine) simply tallies the input frequencies of the phonological characteristics of word stems and the corresponding phonological patterns in affixes. If a particular sequence is statistically likely, the model will extend previously noted regularities to the new data. Thus, *showed, mowed, towed,* and *glowed* may imply the statistical likelihood that *growed* is the correct past tense of *grow*. PDP models assert, thus, that connections, not "rules," underlie language development.

# Concluding Remarks

1. It has been increasingly plausible to many researchers that multiple mechanisms may be involved in the full range of language skill acquisitions.

2. It should be clear at this point that we should add another feature of theories to the list presented at the beginning of this class: theories are *selective*. Each of them concentrates on only some of the phenomena under consideration and has little to say about the others.

3. Theories, of course, ultimately require data. Because young children do not possess the *metalinguistic* ability that would allow them to describe for us their linguistic systems, we rely upon various forms of observation, experimentation, and assessment in the study of children's acquisition of language. Thus, the search for new sources of data and new ways to evaluate old sources of data continues.