

# Language Development



Psych. 414

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# Learning Objectives

- Understand what constitutes language; recognize levels of analysis
- Identify major milestones in language development (text)
- Recognize theories and mechanisms of language development
- Critically analyze one key issue in the study of language development

# What is language?

- Sequence of arbitrary symbols which are combined in an orderly fashion
- These symbols convey meaning and follow conventions

# Language's rule systems

- **Phonology:** governs the sequencing of phonemes
  - Phoneme: basic speech sounds that differ in their distinctive features (e.g., “ba” vs. “pa”)
- **Morphology:** governs the sequencing of morphemes
  - Morpheme: the smallest units of language that carry meaning (e.g., help vs. helper)
- **Syntax:** ways that words are combined to form acceptable phrases or sentences:
  - “I went to the store” vs. \*”I store the to went”

# Language's rule systems

- **Semantics:** meanings of words and sentences
  - vocabulary
- **Pragmatics:** knowledge underlying the use of language in context
  - Taking turns
  - Staying on topic
  - Language customs and routines

# Theories of language development

- Learning/behaviorist theories
- Biological/nativist theories
- Interactionist theories

# Learning/behaviorist theories

- Emphasize role of the environment
- Apply learning principles to account for language learning
- Classical conditioning
- Operant Conditioning
- Imitation

# Classical conditioning

- Word learning based on association

“dog”





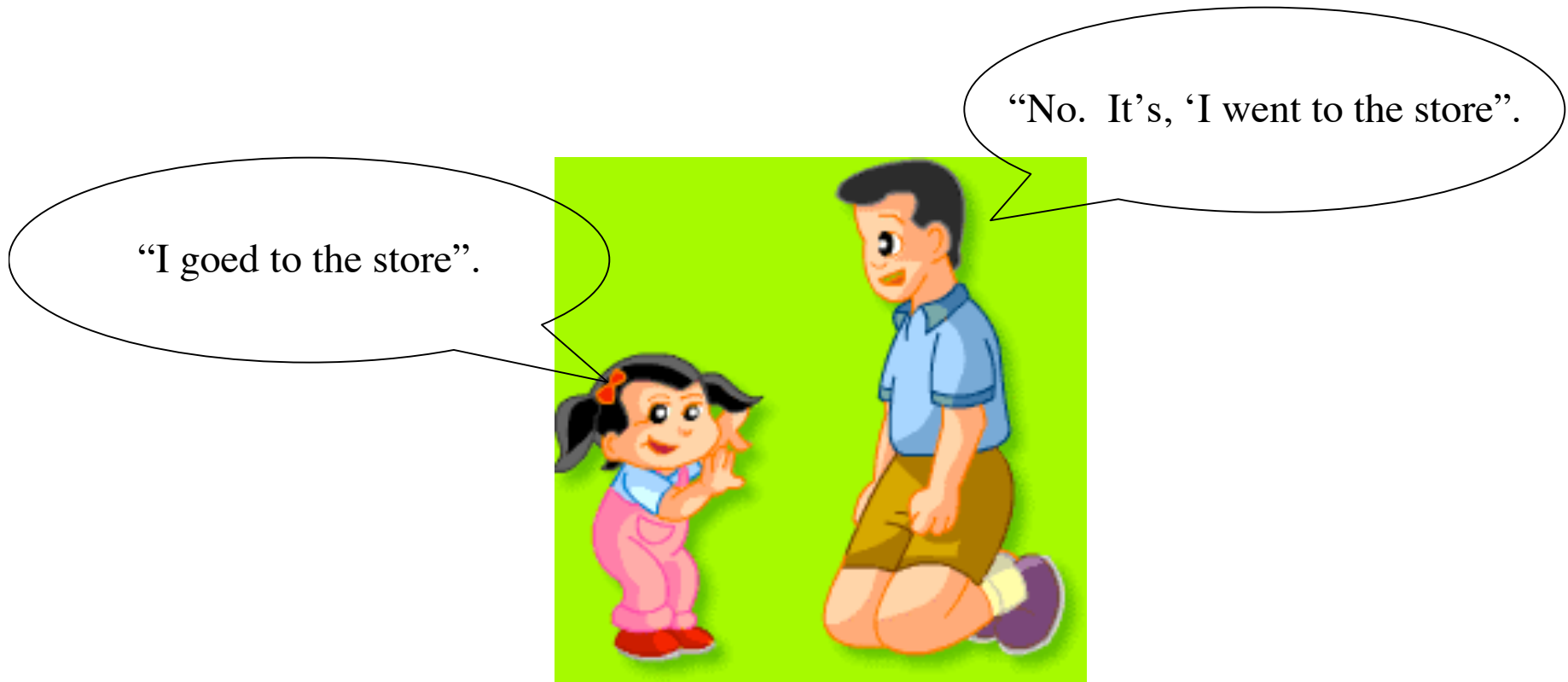
# Imitation

- Children reproduce words and sentences after hearing them used by parents and peers



# Operant conditioning

- Parents reinforce language learning, particularly grammatical development



# Critiques of behaviorist theories of LD

- Association:
  - Referential opacity
- Imitation:
  - Rare
  - Comprehension precedes production
  - Errors are novel
- Reinforcement:
  - Rare
  - Based on truth value of sentence not grammatical value

# Poverty of the stimulus

- Children receive limited input:
  - Fragmented and incorrect sentence
  - Not marked as deviant
  - Finite set of sentences
- **But** create a very complex language system
  - Not just reflective of input they receive
  - Acquire rules that they have no direct evidence for
- Why, then, is language development a  
**RELATIVELY RAPID AND ERROR-FREE  
ACQUISITION?**

# Nativist/biological theories

- Because....
- Language is not learned like other types of behavior
- Humans are biologically wired to learn language at a certain time in a particular way

# Chomsky

- Children enter the world knowing certain things about language
- Language Acquisition Device (LAD): special language-learning mechanism embodying knowledge about the general nature of grammars.

# LAD

- 2 types of knowledge:
  - *Formal and substantive universals*: properties that all languages share
    - E.g., language is hierarchical, language has categories
  - *Parameters*: aspects of language that vary within specifiable limits across languages
    - E.g, pro-drop vs.. non-pro drop languages
- Input:
  - Turns”on” LAD
  - Sets parameters that are specific to a given language
- Therefore, inadequate input can trigger full knowledge of syntax

# Evidence for innate grammar

- Goldin-Meadow: congenitally deaf children of hearing parents not exposed to ASL
  - children invented a gestural language termed **homesign**-- similar in many respects to the language of children with normal hearing
    - One sign --> two signs, etc.
    - Similar ordering of categories of signs (noun, verb, etc.) across children



# Other evidence for the biological basis of language

- Brain basis
  - Areas in left hemisphere (Broca's, Wernicke's) selectively involved in language production and processing.
  - Newborns' left-hemisphere more sensitive to speech sounds

# Sensitive periods for language acquisition

- Lenneberg (1967):
  - Language is a maturational process that occurs between 18 months of age and puberty
  - Language acquisition should be easiest during this time, when the brain is developing
  - Late acquisition of left-hemisphere damage has a larger impact on language skills (than early acquisition)

# Sensitive periods for language acquisition

- Cases of severe deprivation:
  - Genie
  - Severely neglected
  - Very limited language input, punished if she tried to speak
  - Discovered at 13
  - 3-word utterances, but lacking grammatical skills

# Sensitive periods for language acquisition

- Second-language learning
  - Johnson & Newport (1989)
  - 46 Chinese- and Korean-American immigrants (3 - 39 years of age)
  - Strong linear relation between age of exposure and mastery of grammar
  - Significant deficits after puberty
  - Also applies to deaf individuals who learn ASL late in life

# Critiques of nativist/biological theories

- Innate grammar:
  - Lack of specificity
  - Grammar is limited in deaf children not exposed to ASL
  - Complexity of grammar is related to complexity of input (multi-clause sentences)
- Sensitive periods:
  - Relative, not absolute
  - Mediated by motivation

# Interactionist perspectives

- Language develops from the **interaction of biological, cognitive and environmental influences**
  - Biological predispositions
  - Cognitive tendencies or constraints
  - Cultural and environmental influences

# Interactionist perspectives

- Infant-directed speech:
  - Caregivers and other adults spontaneously produce speech with accentuated pitch, intonation and melodic contours
  - Infants prefer this type of speech over regular speech and non-speech sounds
  - IDS may facilitate language learning (e.g., help word segmentation)

# Interactionist perspectives

- Fast mapping:
  - New words are learned based on a minimum of exposure
  - Words as special stimuli?



# Interactionist perspectives

- Constraints:
  - Children selectively attend to some aspects of the language learning environment over others
  - Narrows the hypothesis space
  - Whole object assumption, taxonomic assumption, mutual exclusivity

# Constraints



Whole object assumption

Taxonomic assumption

Mutual exclusivity

Innate or learned?

# Interactionist perspective

- Bootstrapping:
  - Using one aspect of language knowledge to facilitate another aspect of language knowledge
  - Syntactic bootstrapping: use grammar to determine semantic knowledge
    - The duck is gorging the bunny

# Interactionist perspective

- Social-cognitive contributions:
  - Early on infants are sensitive to social stimuli
  - During infancy developing an understanding of goal-directed action and the attentional and emotional states of others
  - This knowledge is brought to bear in the language learning context
    - E.g., Adults label objects that they are looking at

# Social cognitive contributions

- By 18 months:
  - Infants use an actor's eye gaze to map objects to their referents
  - Consider intentionality when mapping verbs to actions
  - Use another's emotional expression to infer the target of her referent

# Explaining Language Development: Summary

- Biological, cognitive and environmental factors all contribute to language learning
- Goldin-Meadow:
  - “Resilient” properties of language:
    - Not crucially dependant on quality or quantity of input
  - “Fragile” properties of language:
    - Input dependant

# Baby signs

- Pre-speech gestures that infants can use to communicate
- Infants gain control over motor movements before vocal tract
- What impact does teaching infants these signs have on subsequent language development and cognitive development?