Language Development

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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.

“I goed to the store”.

“No. It’s, ‘I went to the store’.”
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
  – 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 gorping 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?