

## General approaches to language acquisition

A history of theory in language acquisition

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## History of Psychology

- Began to be its own field in the mid to late 1800s
- Helmholtz, Wundt
- Introspection
  - Rigorous, contemplative description of one's private experience

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## Problems with introspection

- one cannot introspect the act of introspection.
- little agreement.
- Requires meticulous training
  - Bias?
  - No discovery is possible from those who are trained specifically on what to observe.
  - restricted to the class of sophisticated, trained adult subjects - not general
- Due to the extent of the pathology of mind, self-report is hardly to be trusted.
- Much of behavior occurs without conscious correlates.

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## Behaviorism

- Reaction against introspection
- Argued against analyzing the mind, but instead focused on **publicly observable** behavior
  - Only what can be observed
- Children are passive during the process of learning language

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## B. F. Skinner

- Behavior is adaptive, as in biology/evolution
  - Reinforcement and punishment affect this
- Verbal behavior is reinforced through the mediation of other persons
- It is not symbolic
- This became the primary approach in the US

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## Operant conditioning

- Operant - behavior whose frequency can be affected by responses that follow it
  - Reinforcement causes behavior to increase
  - Punishment causes behavior to decrease
- Preceding events can determine whether a behavior occurs in the first place

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## Shaping

- Gradual approximation of the desired behavior
- Each step requires closer approximation in order to get reinforcement

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## Operant conditioning & acquisition

- Child acquires language as a result of selective reinforcement
- Caregiver provides models of speech, child imitates, and best imitations get more reinforcement

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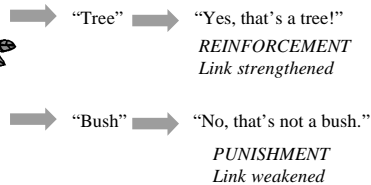
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## Word-learning



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## Other approaches

- Psychophysics/psychoacoustics
- Piaget- mentalistic theory of developmental stages
- Alexander Luria focused on frontal cortex functions & language disorders
- DESPITE ALL THESE ALTERNATIVES, BEHAVIORISM WAS VERY WIDESPREAD AND POWERFUL

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## The backlash

- One of the major forces against this was a review of Skinner's (1957) book Verbal Behavior by Noam Chomsky
- Important thing about language is it's creativity

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## Chomsky

- 'deep' vs 'surface' structures
  - example: “John is easy to please” and “John is eager to please”.
- Ambiguous sentences
  - Visiting relatives can be a nuisance
  - They are cooking apples
  - The chicken is ready to eat

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## Chomsky

- Humans are born with an innate ability to acquire language
- Language acquisition device (LAD)
- Languages have certain similarities, as a result of this innate structure

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## Transformational Generative Grammar

- Phrase structure rules
  - describe underlying relationships of words/phrases at deep level
- Transformations
  - describe how these get realized at the surface level

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## Transformations

*The boy hit the girl.*

*The girl was hit by the boy.*

- These have the same deep structure.
- There is a transformational rule for passives that allows you to go from the (first) deep structure to the passive surface structure.
- This rule allows you to make a passive for any sentence.

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## Phrase structure rules

- Basic rules about how sentences are formed.

*Sentence = Noun phrase + verb phrase*

*Verb phrase = Verb (+ noun phrase)*

*Noun phrase = (Determiner) + (Modifier(s)) + Noun*

- All possible sentences conform to the basic phrase structure rules

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## Evidence/Arguments

- Attempts to teach chimpanzees language
- Twins, sign languages, pidgins & Creoles (language creation?)
- Lack of imitation
- Lack of reinforcement/negative evidence
- Learnability or lack thereof

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Fig. 1. The Nicaraguan Sign Language signs "see" (a) and "two" (b), produced in a neutral direction and spatially modulated to the signer's left.

### NSL

Age at Exposure	Cohort 1 (Mean)	Cohort 2 (Mean)
Early (<6:6)	~1.2	~1.5*
Middle (6:6-10)	~1.0	~1.4*
Late (>10)	~0.8	~0.7

Fig. 2. Mean number of spatial modulations per verb produced by early-, middle-, and late-exposed signers of the first and second cohorts. Asterisks indicate a significant difference between cohorts within an age-at-exposure group.

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## Other approaches

- Government Binding theory
  - There are limits on the types of hypotheses a learner could come up with, as a result of a Universal Grammar.
- Semantic/Cognitive
  - Language develops from cognitive development
- Sociolinguistic
  - Focuses on communication

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## Nature vs. Nurture

- To what extent is language innate, vs. to what extent is it learned?
- The original debate between nature and nurture remains, despite the fact that most people are not fully in either extreme

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