Child Language Acquisition

General Linguistics

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(Some slides: Petra Hendriks)

Levels of language

• Text/Dialogue	⇨	Pragmatics	(lecture 11)
• Sentences	⇨	Syntax	(lectures 5 en 6)
		Sentence semantics	(lecture 10)
• Words	⇨	Morphology	(lecture 4)
		Lexical semantics	(lecture 9)
• Syllables	⇨	Phonology	(lecture 3)
• Sounds	⇨	Phonetics	(lecture 2)

Structure of the lecture

1. Characteristics of child language
   - Characteristics of adult's interaction with children

2. Nativism vs. Empiricism
   - Main theories
   - Evidence for innateness

Language Learning Paradox

Learning a language:

- Easy for children
- Difficult for adults and computers

Methods of child language study

- Naturalistic observation:
  - Diary studies (made by parents)
  - Databases, e.g. CHILDES (Child Language Data Exchange System)
- Experiments:
  - Interpretation experiments
  - Production experiments
  - Imitation experiments

Pattern to language acquisition

All children go through the same phases:

- Pre-language phase (0-12 ms)
  - Egocentric babble phase (4-6 ms)
  - Social babble phase (7-12 ms)
- Early language phase (12-30 ms)

- MLU (mean length of utterance) = measure of child's linguistic maturation

Infant language

- Infant language, MLU < 1
- Sound production stages:
  - crying
  - cooing, 0;1
  - babbling, 0;6, syllables produced containing all language sounds
    - pattern of difficulty and general order of acquisition universal

Methods to study perception in infants

- Hear rate and activity
  - interesting stimuli increase heart rate and activity
  - with *habituation* activity decreases
- HAS: high amplitude sucking
  - each suck causes a sound to be played so that the infants can control how much they hear
  - new sounds increase sucking rate for a while, until sucking slows

Sound perception: infants

- Three days: infants respond to mother's voice differently than compared to other women
- One-month old infants
  - discriminate rising and falling intonation in singly syllables (Morse 1972)
- infants make same speech-nonspeech dstinctions as adults
- infants discriminate the categories relevant to their language

Production: MLU = 1

- First words: 10-12 months of age
- generally nouns
- Meaning mismatches:
  - ***Overextension*:** child generalizes a word inappropriately to other objects with similar characteristics; e.g.
    - *daddy = all men, doggie = all mammals*
  - ***Overrestriction:*** child uses a word only for a very specific instance of the words usage
    - *muffin = blueberry muffin*

MLU > 1

- Two word stage: words strung together

  all broke, all clean, all done

  do it, push it, close it,

  get ball, get doll, get Betty

  want baby, want car, want do, want up

  byebye ball, byebye car, papa byebye

- Do children have syntax at this stage?
  - disagreement about how to describe the syntax of two-word strings

Development of vocabulary (Schaerlaekens, 1977)

Age :	*Number of words:*
• 8 months	0
• 12 months (1 jaar)	3
• 18 months	22
• 24 months (2 jaar)	272
• 36 months (3 jaar)	896
• 48 months (4 jaar)	1540
• 60 months (5 jaar)	2072
• 72 months (6 jaar)	2562

➔ Vocabulary spurt from 50 words related to naming instinct?

MLU > 2: “Telegraphic speech”

- Telegraphic speech: inflection absent, auxiliary verbs and articles absent, prepositions and pronouns present, e.g.

- See truck Mommy
- There go one
- Put truck window
- (McNeill 1966)

Imitation data

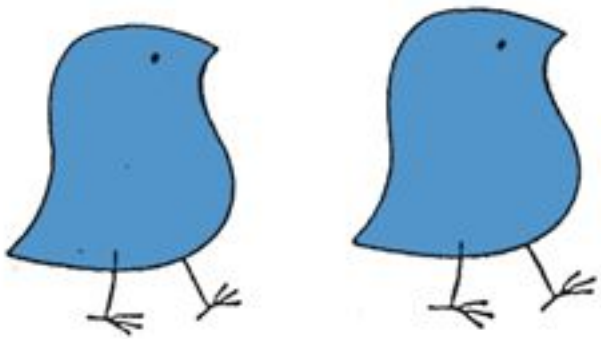
- Imitation data indidcate that these simple utterances do conform to adult grammar
- (Brown 1973)
  - "I showed you the book" =
    - "I show book" (25m)
    - "?book" (28 m)
  - "I am very tall" =
    - " I tall" (25m)
    - "very tall" (28m)

Acquisition of inflections

- Example: English past tense, regular and irregular forms
  - 1st stage: forms correct, child says “went”, “ran” and “seen”, as well as “touched”, “opened”
  - 2nd stage: productive rule recognized, child now applies rule in all cases, saying “ goed”, “runned” and “seed”
  - 3rd stage: child distinguished between regular and irregular forms, saying “went”, “ran” etc.

The Wug Test

This is a wug.



Now there is another one.
There are two of them.
There are two ___.

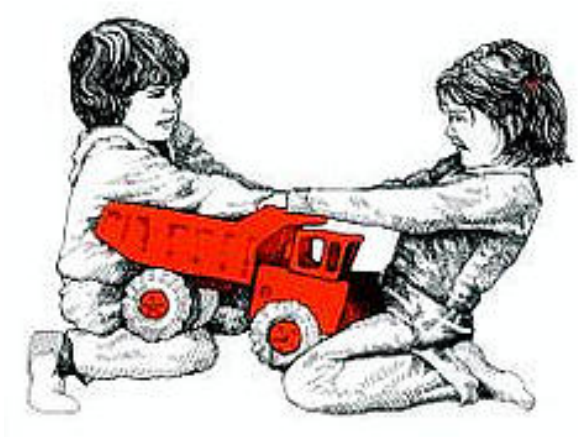
Berko (1958)

Motherese

nou, moet je goed wassen
ja, goed
goed je armen
goed zo
en je nek
in je nek ook

Motherese

nee! is van mij
geel is van mij
blauw en rood is van jou
nee
is van mamma, ja
is niet van jou
niet van Laura



Characteristics of Motherese

Motherese is the language of a caretaker to a child:

- Lowered speech tempo
- Clearer articulation
- Higher pitch
- Full names instead of pronouns
- Concrete references to the here and now
- Simpler sentence structure
- Few incomplete sentences
- Many repetitions

The role of Motherese by acquisition

- Motherese might help acquisition
- Motherese seems to be focussed on the level of the child
- However: Not all cultures seem to use motherese
  - Heath (1983): in a black community in South Carolina‘baby talk’ is not used

How do children learn their mother tongue?

- **Empiricism:** linguistic knowledge is learned through environmental interaction
  - focus on general learning principles
  - changes in general cognitive development
  - acquisition of meaning core area of study

- **Nativism:** linguistic knowledge acquired by the child is innately specified
  - focus on innate abilities
  - acquisition of syntax core area of study

Two perspectives
(From lecture 1)

View One Language is based on general cognitive skills, and learned like any other learning.

- Pyschologists, computer scientists working with language

View Two Language is a special type of knowledge, for which we are programmed. There is a "universal grammar" underlying all languages. Specific learning mechanisms are used by children when acquiring language.

- (Generative) linguists

Empiricism

1. Maturational changes in thinking process lead to learning, and language
   - Piaget, Vygotsky
   - child studies environment, makes classifications, language part of general learning process, dependent on cognitive growth
2. Acquisition can be explained as reinforcement of behavior to stimuli
   - Skinner, Behaviorism
   - child passive recipient to parent's model behavior
   - some inspiration from learning in animals

Piaget

Piaget: Language acquisition depends on concept acquisition, study child to study learning

Piaget believed :*"that language cannot be considered alone; that it cannot be detached from the total context of symbolic function which entails at least four behavior patterns which appear almost simultaneously, namely, deferred imitation which starts after the disappearance of the model, symbolic play, evocative memory and mental imagery"* (Piaget, 1983, p. 112)

1st cognitive stage

0-2 yrs old = sensorimotor thinking → symbolic representation

Object permanence: ability to conceptualize an object not in view

Word and act confused; need to understand word is label (unlike e.g. prayers, spells, curses)

Next stage is reached when language becomes symbolic

2nd Cognitive stage

Preoperational thinking: thought organization is unsystematic

Adult: “Why is a dog called a “dog”?”

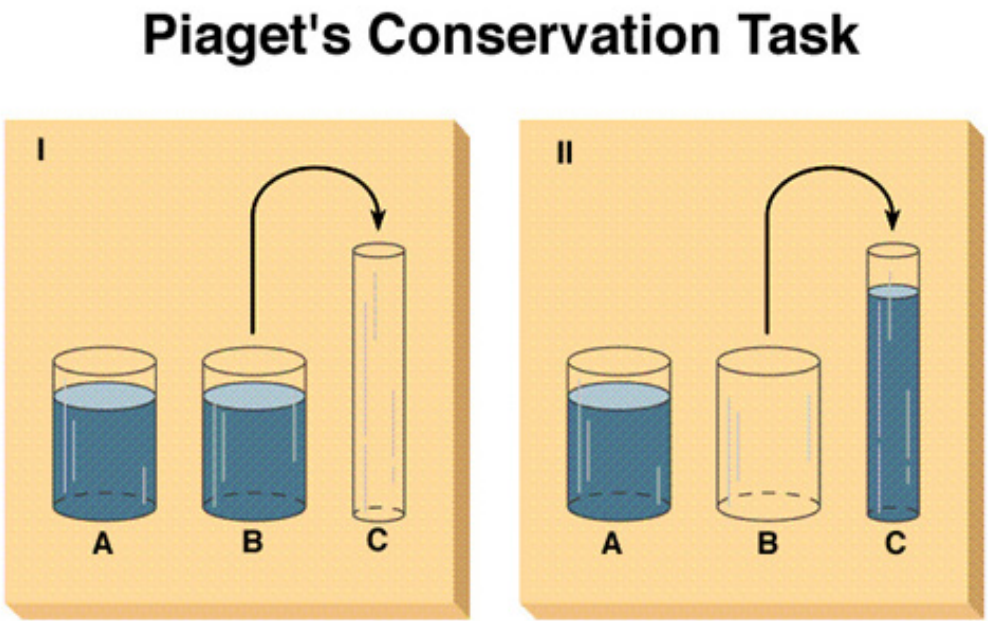
Child: “Because it is a dog.”

Adult: “Could it be called a cow?”

Child: “No. Because a cow is a cow.”

3rd Cognitive stage

- Children develop *concrete operations* for organizing ideas



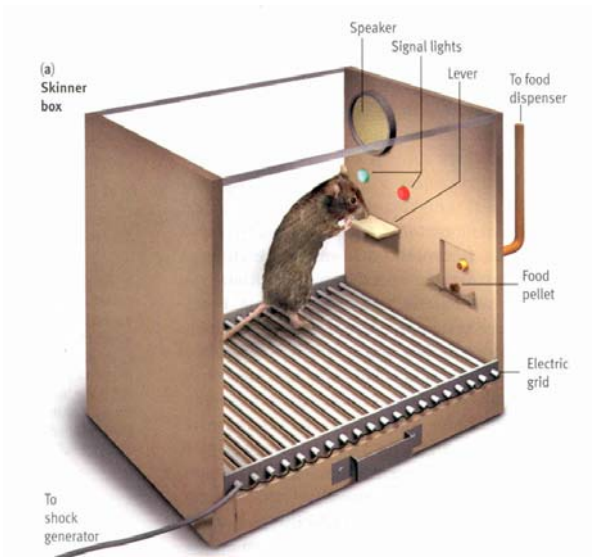
Skinner

- Language acquisition is behavioristic
  - = behaviorism
- Child learns by copying parents

Study parent-child interaction

Parents “teach” children by modelling

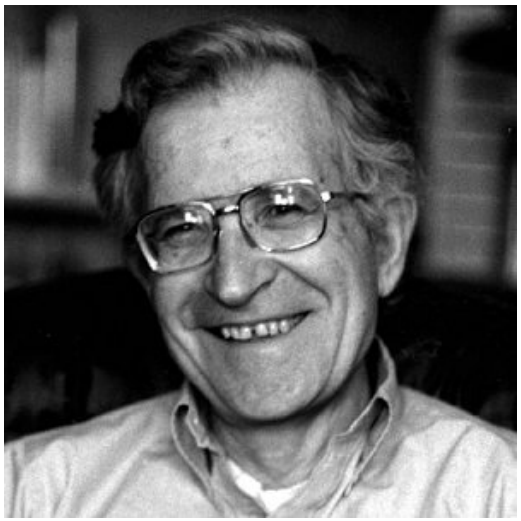
- Skinner became famous for his work with rats using his "Skinner Box".



- “Skinner had the "wonderful" idea to bring up his daughter in a Skinner Box (see picture below). How anyone could admire this man is beyond me.”

http://www.sntp.net/behaviorism/skinner.htm

Nativism



- Language is innate, pre-programmed
- Chomsky, prevailing believe among linguists

Parents could never teach their children: they have no conscious knowledge of the structure of language

Learn UG = know what children bring to language learning

Innateness?

- **Instincts at birth**
  - crying, being surprised at loud noises
- **Instincts that appear later**
  - producing tears, getting teeth, puberty
- **Instincts that need a prime**
- **Tunable Blueprints**
  - e.g. kittens exposed to light, open eyes
- **Behaviors derived form innate physical changes**
  - crying with sound & tears, basketball

Innateness in cognition

- Many physical change are innate
  - uncontroversional
- Cognitive changes innately controlled?
- If language is innate
  1. How much and what is innate?
  2. How much of this is specific to language?
  3. Do we have reliable methods to determine what is innate and what is learned?

Nativism: language innate

- We are born with an LAD, Language Acquisition Device

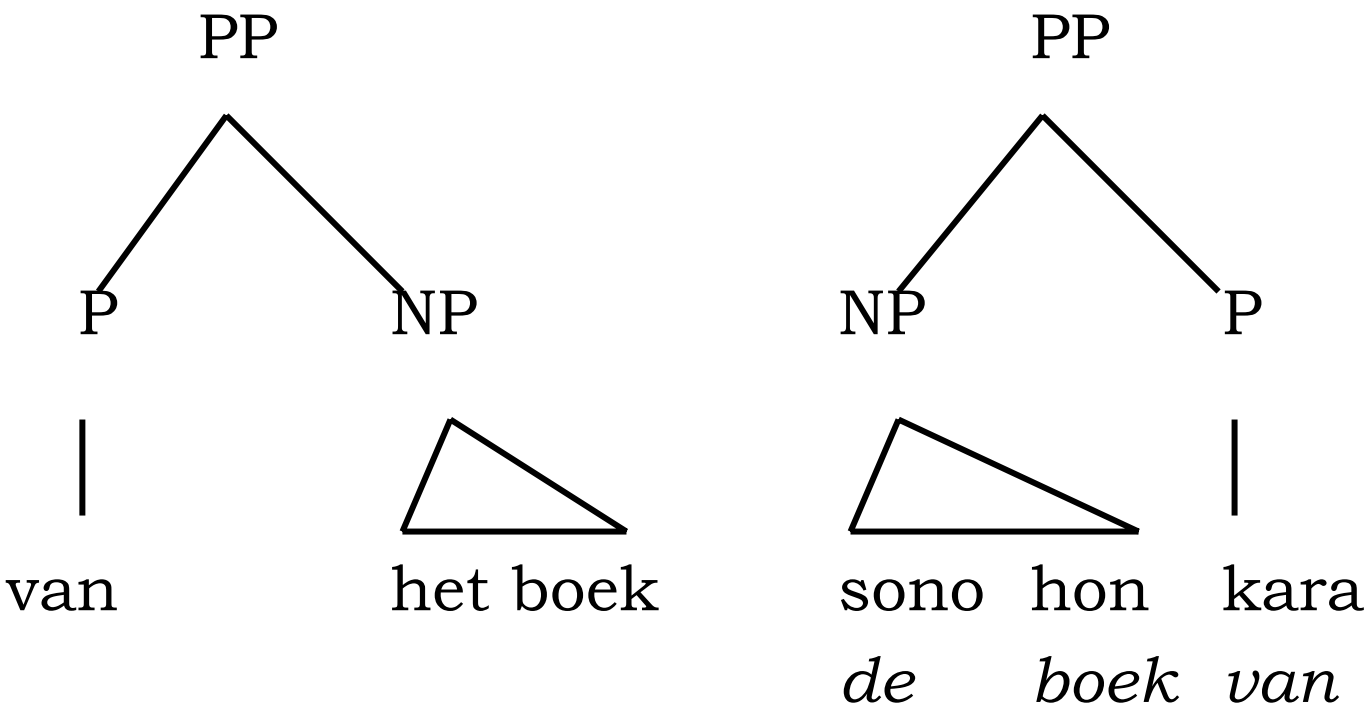
  "(1) a technique for representing input signals,(2) a way of representing structural information about these signals, (3) some initial delimitation of a class of possible hypotheses about language structure, (4) a method for determining what each such hypothesis implies with respect to each sentence, [and] (5) a method for selecting on of the (presumably, infinitely many) hypotheses that are allowed by (3) an are compatible with primary linguistic data."

  Chomsky (1965, p. 30)

Nativism

- Inborn Universal Grammar (UG):
  - Universal principles
  - Language specific parameter settings
- UG underlies every human language
- Language Acquisition = parameter setting ≠ learning
- Non-finite language ➔ recursive rules
- Critical period ➔ the period when parameter setting is possible

Example: Head- parameter



The acquisition process

- Language acquisition = parameter setting.
- 'Triggering' of acquisition by certain input data.
- Unconscious: Children don't get explicit instructions
- Passive: You can't refuse to learn a langauge
- Motivation doesn't play a role

Different perspectives within nativism

- Continuity hypothesis:
  - The inborn language ability is available from the very beginning
- Maturation hypothesis:
  - Some universal aspects of language are not available in the beginning, but “ripen” as a result of a genetically determined developmental process

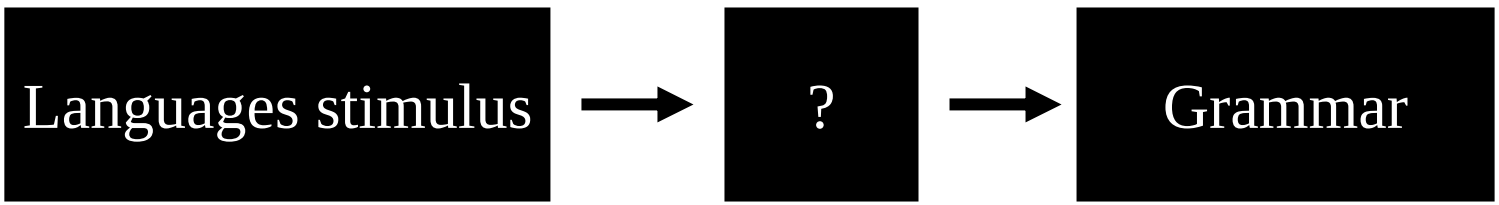
Original arguments for nativism (cf. Sampson, 1997)

- Poverty of the stimulus
- Speed of language acquisition
- Critical period affects
- Convergence on the same grammar
- Language universals

More recent arguments

- Creole languages
- Spontaneous development of sign languages
- Modularity of language
  - Language is disassociated from intelligence
- The absence of certain types of errors
- The discovery of genetic effects on language abilities

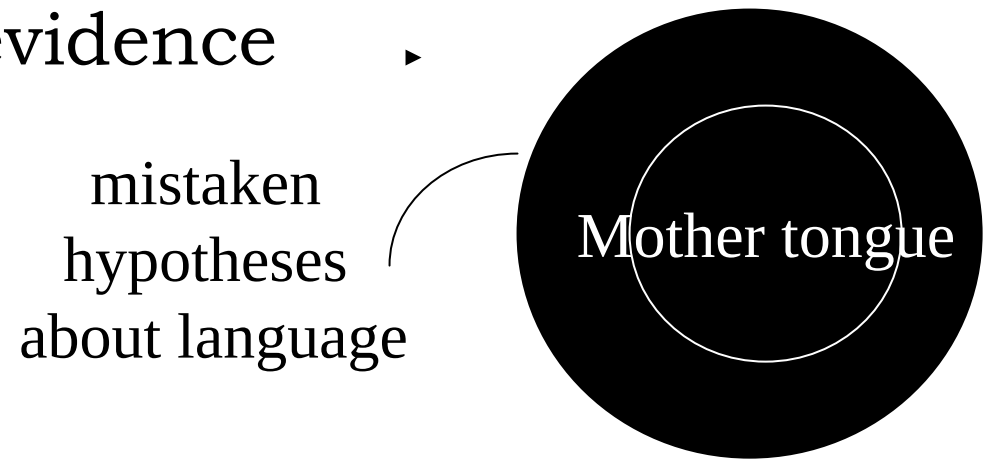
The logical problem of language acquisition



Poverty of stimulus

The amount of language children are exposed to is too little to account for their acquisition:

- Few sentences or constructions
- Input contains errors in production
- No negative evidence



Ineffectiveness of negative evidence (Frijn & De Haan, 1994)

Eva:	mag ik de bord?
moeder:	het bord.
Eva:	mag ik de bord?
moeder:	nee, je zegt het bord.
Eva:	mag ik de bord?
moeder:	het bord.
Eva:	het bord. mag ik nou de bord?

Speed of acquisition

Language acquisition is very fast:

- Baby's that are only a few days old recognize their mother tongue
- Children from 6 or 7 have nearly fully mastered their language
  - But children do have a lot of experimence with language

Critical period

Many aspects of language can't be learned after the critical period (± na puberteit) (Lenneberg, 1967).

Learning is sometimes unlearning e.g., differences that were irrelevant for the first language might need to be recognized:

- Nederlands: l + r ↔ Kantonees
- Welsh: l + ll ↔ Nederlands: l
- Engels: pen + pan ↔ Nederlands: pen

"Ignoring" distinctions not made in the mother tongue happens early on

‘Genie’

- Kept in isolation from the age of 20 months
- Discovered in 1970 when she was 13;7 years old
- Language development documented by Susan Curtiss.
- Big question: Is it still possible to learn a language at this age?
- Genie only developed a limited syntax:
  - Applesauce buy store.
  - Man motorcycle have.

Critical period effects

- Are critical period affects restricted to language acquisition?
  - Or are there other critical periods?

Arguments for empiricism

- Why should language be any different than other cognitive skills?

- No extra assumptions necessary (cf. Occam's razor).

Is syntax autonomous?

- Argument related to the lack of negative evidence depends on a strict distinction between form and meaning
- Because: Sentences are part of the grammar (produced by the grammar) based on their form; their meanings play no role
- However, is form and meaning strictly separate: Is syntax an autonomous module of our language module
- Or: can meaning give us clues about the syntactic structure of a sentence?

Children make same mistakes

- fluit instead of fruit
- hond = only for own dog (= undergeneralization)
- hond = all animals (overgeneralization)
- loopte instead of liep / een kleer (singular form of “kleren”)
- *Tobias doen* instead of *doen Tobias*
- *taartjes bakken* instead of *bakken taartjes*
  - *NOTE: OV!!!! (agrees with belief that Dutch is SOV!)*
- Compare with English *bake cookies*
  - (English should be SVO)

Certain errors are not made

- The man is sad.

In forming yes-no questions:

- Is the man sad?
- The man who is tall is sad.

Which verb has to be moved?:

- Is the man who is tall sad?
- *Is the man who tall is sad?

Choice of verb is dependent on the structure of the sentence: verb in the main clause

Convergence to the same grammar

Each child is exposed to different input, yet all children seem to acquire the same language

Question: How identical are the grammars of two speakers of the same mother tongue?

Language universals

- Examples of language universals:
  - Movement is determined by structure
  - All phrases conform to an X-bar structure
- Difficult to explain as language universals because they refer to abstract, unobservable structures
- It is simpler to find tendencies related to observable language qualities (cf. Greenberg)than it is to find “universals” .
- Problem with this: Language universals are used as a basic assumption for nativist researcher and at the same time it is an argument for nativism

The development of creole languages

Creole languages developed out of nothing:

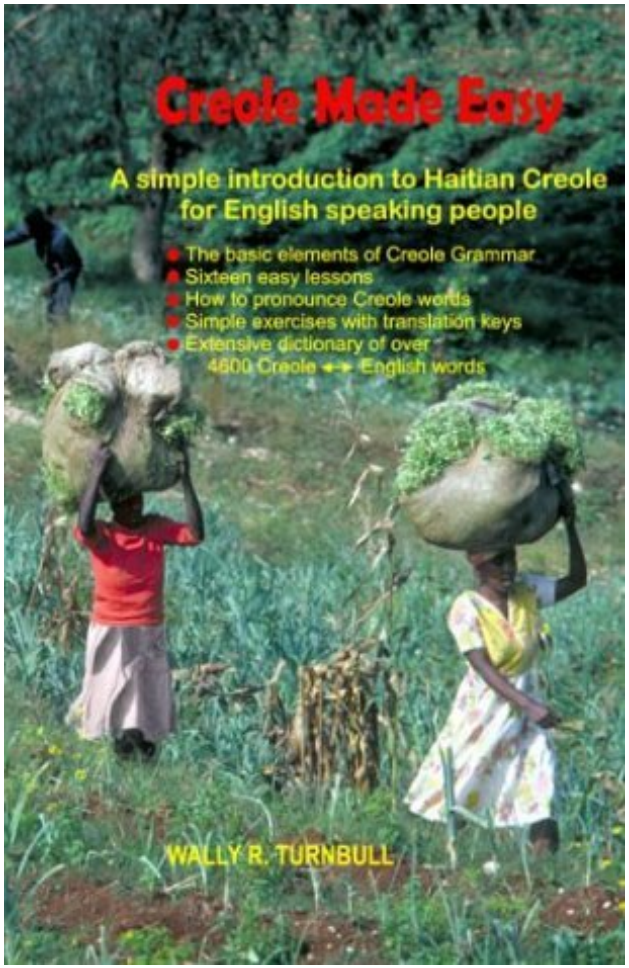
Speakers of different mother tongues → use a pidgin language

Their children → develop a creole langauge.

Pidgin-langauges

- Reduced vocabulary
- Many loan words (often from the plantation owner)
- Variable word order, meaning is context-dependent
- Almost no grammatical structure

Creole languages



- Standardized word order
- Grammatical structure
- Example of recently developed creole language: sign language in Nicaragua
  - (see Pinker, 1994)

- Question: If creole languaes are derived from UG, or are in fact identical with UG, (see Bickertons Language Bioprogram hypothese), why are there then differences between creole languages (that can be accounted for as differences in vocabulary)?

Modularity

Learning a language is relatively independent of IQ:

Cases where language ability is damaged, but general cognitive abilities are intact

- Cases where general cognitive ability is damaged but language ability is intact
- Double dissassociation, language is therefore independent of the cognitive module
- Every module has its own features of development

However, modularity of language ability in itself doesn't say much about whether or not language ability is inborn

Linguistic idiot-savant

- Christopher (Smith & Tsimpli, 1995)
- Damage to the central system (IQ of about 50)
- Language ability intact

Pro-drop

Italiaans	*Nederlands*	**Nederlands*
(io) parlo	ik spreek	*spreek
(tu) parli	jij spreekt	*spreekt
(lei) parla	zij spreekt	*spreekt
(noi) parliamo	wij spreken	*spreken
(voi) parlate	jullie spreken	*spreken
(loro) parlano	zij spreken	*spreken

Experiment Smith & Tsimpli

Learning different grammars:

- Non-pro-drop-talen
- Pro-drop-taal (Berber)

- Made-up language that is against UG principles (Epun)
  - Negation made by verbal fronting
  - Past made by changing word order from SVO to OSV

Results of the experiment

- Christopher had no problems with pro-drop languages and non-pro-drop langauges
- However, Christopher was not able to learn languages that go against UG principles
- ➔ UG is inborn?

Language gene

- Gopnik (1990): KE family in Essex
- Language impairment with a genetic basis
  - FOXP2 gene mutation
- Problemen with linguistic rules such as forming a past tense or a plural form:
  - nonsense-word *zat* ➔ plural *zacko*
  - (normal adults: *zats*)

More research on language genes

- Vargha-Khadem et al. (1995) researched the KE family more closely
- Conclusion: The problems that the KE family show are not totally language specific:
  - Problems with pronunciation
  - Problems with naming known objects
  - Average verbal IQ is 75, average IQ other skills, 86
  - Impaired ability to perform simultaneous and sequential actions
  - And suprising: Overgeneralization of language rules

Other examples (from lecture 1)

- Sufferers of William's syndrome
  - Musical, very talkative
- Sufferers of Supernumeracy 9
  - Poor language skills
- Piraha (unsure what the implications of their language is)

Recent Chomsky position

- Marc Hauser, Noam Chomsky & W. Tecumseh Fitch (2002) in *Science*:

- "We hypothesize that FLN [the faculty of language in the narrow sense] only includes recursion and is the only uniquely human component of the faculty of language."
- Language might have developed as a byproduct of other skills, e.g. counting, navigation and social relations

In between

- A number of arguments for nativism
- For some of these arguments an alternative explanation is possible or even more probable
- For other arguments nativism still seems to offer the best solution
- There are more than enough questions that can be studied via empirical research

Next time

- Semantics