ELL101: Intro to Linguistics
Week 10 Lang. Acquisition

Tomonori Nagano <tnagano@lagcc.cuny.edu>

Education and Language Acquisition Dept.
LaGuardia Community College

August 16, 2017

Related fields of language Acquisition

Neurolinguistics

The study of the relationship between language and the brain.

First Language Acquisition

The study of the acquisition of one's primary language(s); it almost always means the language acquisition by children

Second Language Acquisition

The study of the acquisition of one's secondary language(s) (foreign languages); it almost always means the language acquisition by adults

Neurolinguistics I

- The case of Phineas P. Gage

  In 1848, near Cavendish, Vermont, a construction foreman had an accident and a three-and-a-half-foot long tamping rod pierced his head (from the upper cheek to the front top of his forehead). In spite of the severe (and seemingly fatal) damage to the frontal area of his brain, Phineas Gage became up and about without any observable loss in his language abilities.

Neurolinguistics II

- The case of Phineas P. Gage

  The Phineas Gage's example suggests that the brain localizes different skills into different areas. (so, the frontal area of the brain seems to have nothing to do with the language abilities).

  Where are the language abilities located?

Figure 2.2 The human brain viewed from above. The physical appearance of the human brain does not reveal what the brain does or how it does it. The field of neurolinguistics is devoted to the study of what structures in the brain are involved in language processing and language acquisition and how those structures serve their linguistic functions.

Neurolinguistics: Brain I

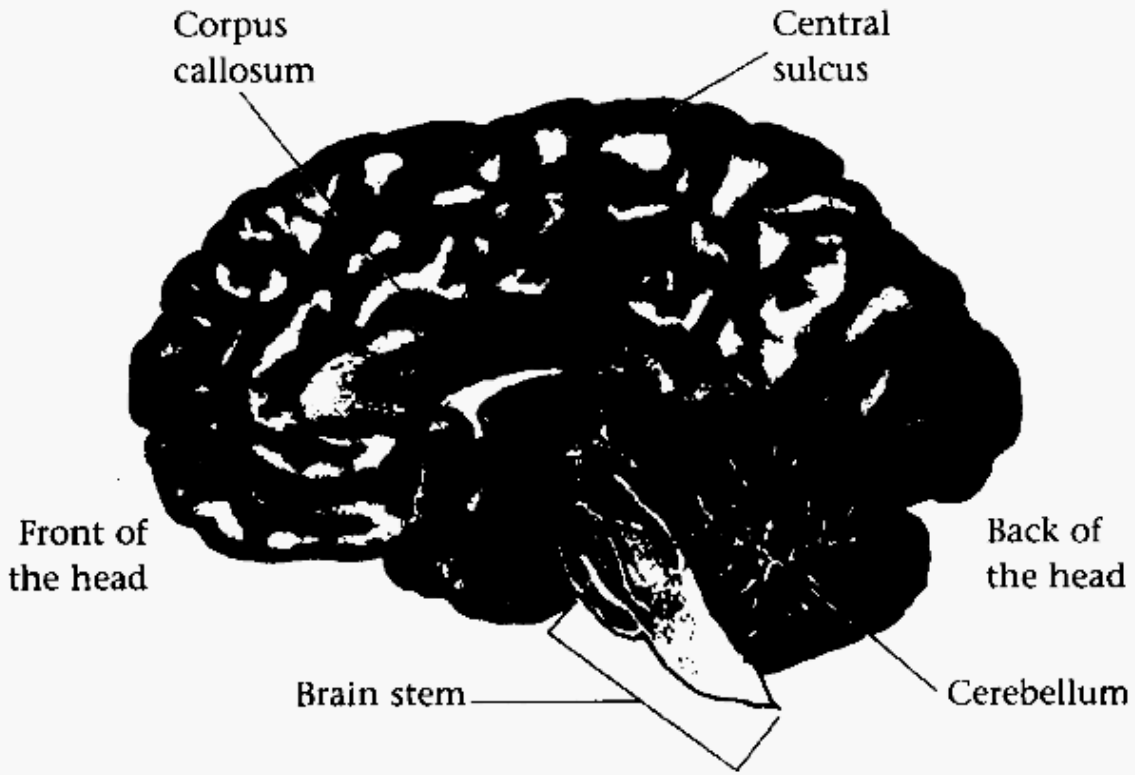


Figure 14.2 The right hemisphere seen from the inside. In this picture the corpus callosum has been cut so that one hemisphere may be separated from the other. Note how the grey cortex caps the lower structures (the brain stem and cerebellum), which are whitish in color.

Neurolinguistics: Brain II

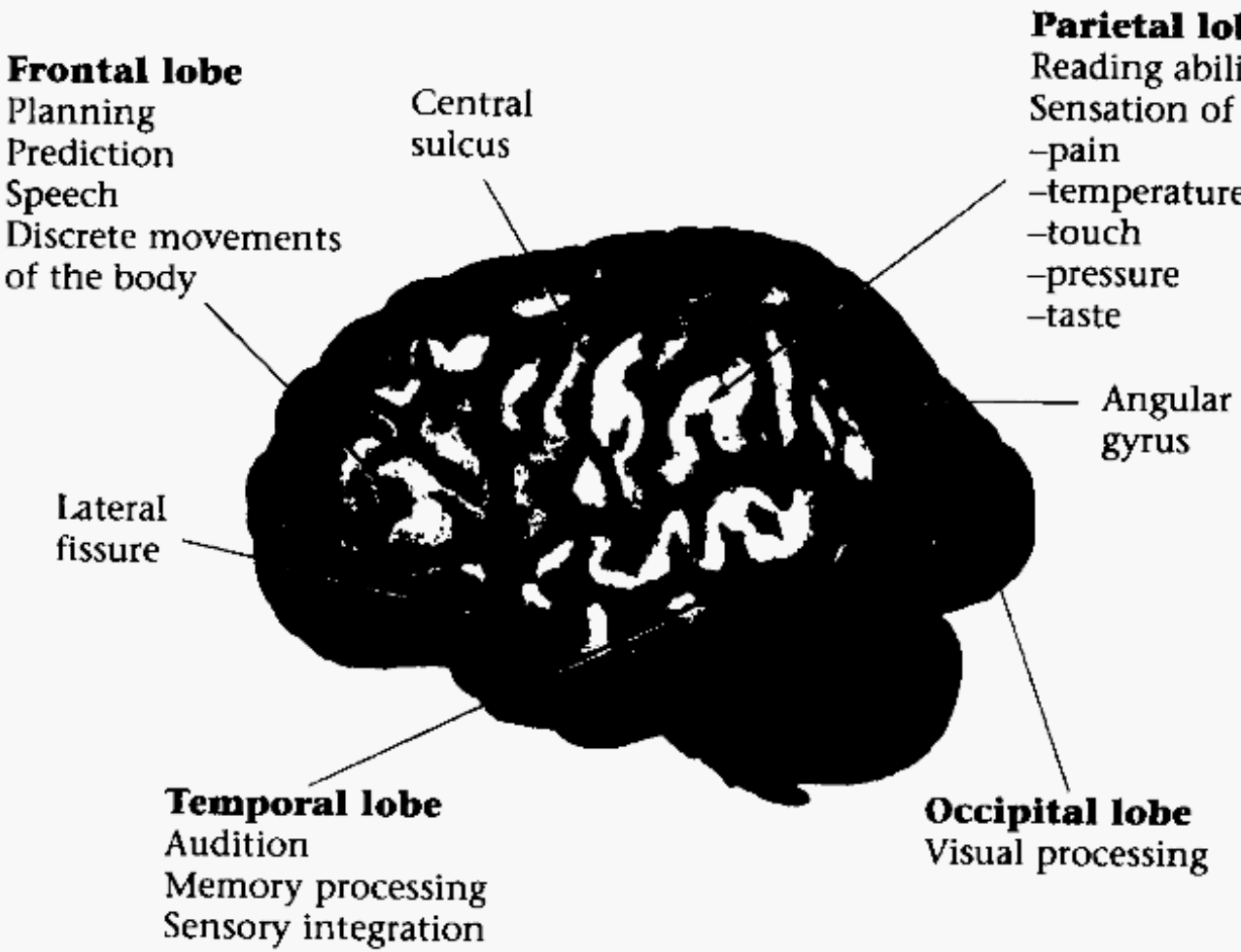


Figure 14.3 The left hemisphere seen from the outside

Neurolinguistics: Brain III

Broca's area

The front part of the left hemisphere (right in front of the left ear) is considered to be associated with syntax (or the production skills, more generally)

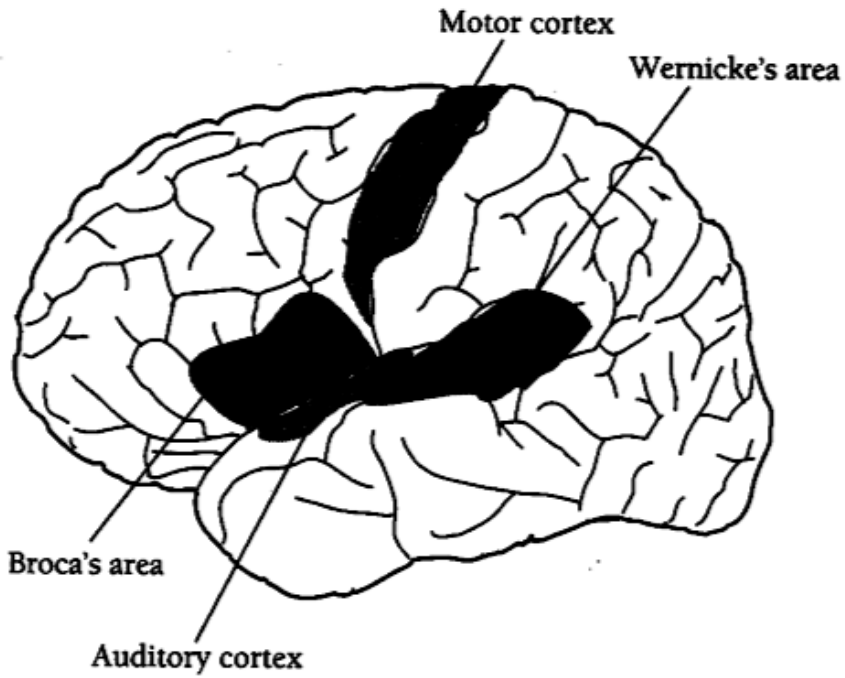


Figure 2.5 Language areas of the brain

Neurolinguistics: Brain IV

Wernicke's area

The back part of the left hemisphere (right behind the left ear) is considered to be associated with semantics (the comprehension skills, more generally)

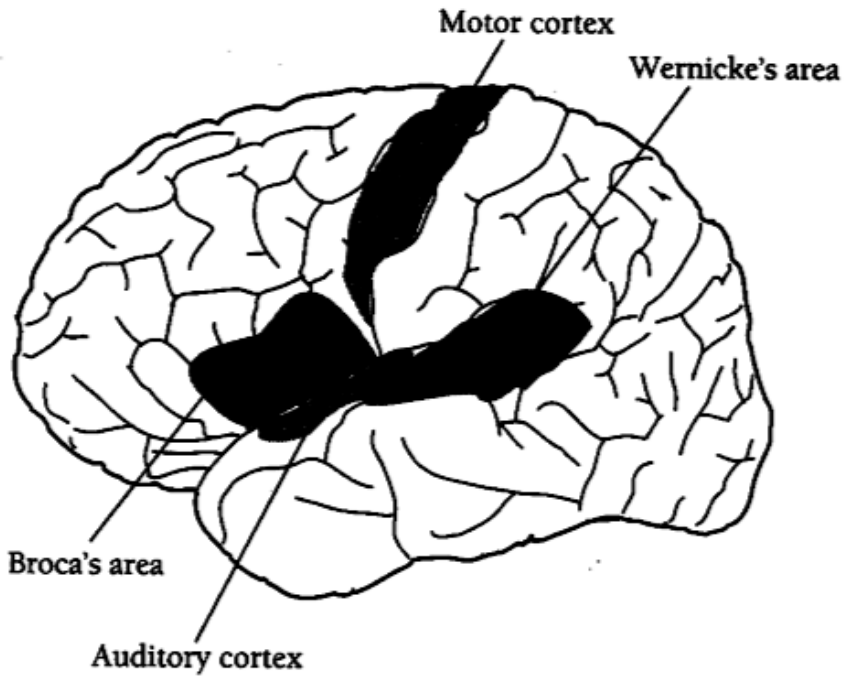


Figure 2.5 Language areas of the brain

Neurolinguistics: Brain V

- However, we should interpret those research findings with a grain of salt. Since we have no direct access to a living brain (we cannot open someone's skull while he/she is speaking), the neurolinguistic research employs a lot of indirect methods.

Neurolinguistics: Experiment methods I

Tip of the tongue

phenomenon A phenomenon that some word is eluding us, but it just won't come to the surface. Usually, people can tell the initial sound of the word and the number of syllables (how long the word is).
e.g., "I know it begins with 's' and it's about five syllables....."

- It shows that the storage for words and the storage for word sound information (phonology) are separate in the brain.

Neurolinguistics: Experiment methods II

Slip of the tongue

Near-miss for words (malapropism); e.g., ”secant” ”sextent” ”sexton” (sextant), ”use the door to open the key”, ”a fifty-pound dog of gab food”, ”you have hissed my all mystery classes”, ”noman numerical” (roman numerical), ”a tup of tea”

- All instances of the slip of the tongue follow the phonological/syntactic rules of the language (e.g., the words are non-sense but its sound is possible in the language). Again, the separate storage for words(lexicon) and phonology/syntax in the brain.

Neurolinguistics: Experiment methods III

Aphasia

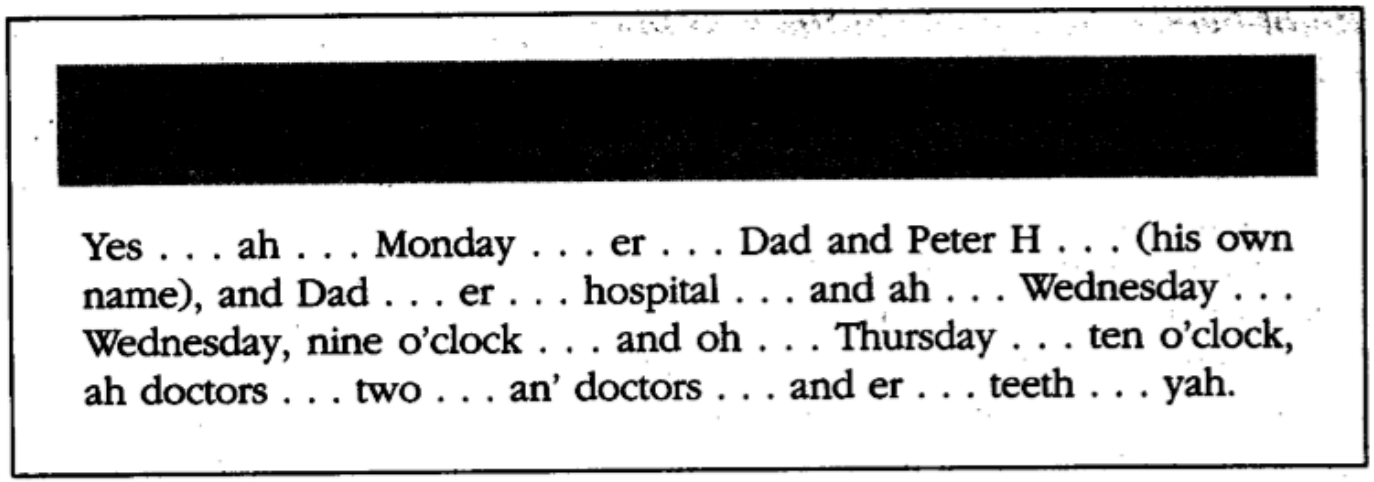
Aphasia is the impairment of language function due to localized brain damage, which leads to difficulty in understanding or producing language forms. Aphasia is commonly caused by a stroke, traumatic head injuries in the war and accidents.)

- Broca's aphasia
- Wernicke's aphasia

Neurolinguistics: Experiment methods IV

Broca's aphasia

- a substantially reduced amount of speech
- disordered articulation
- slow and effortful speech
- consists of only lexical morphemes (nouns, verbs, adjectives etc.)
- frequent omissions of functional items (determiners, 3ps -s etc.)



Yes . . . ah . . . Monday . . . er . . . Dad and Peter H . . . (his own name), and Dad . . . er . . . hospital . . . and ah . . . Wednesday . . . Wednesday, nine o'clock . . . and oh . . . Thursday . . . ten o'clock, ah doctors . . . two . . . an' doctors . . . and er . . . teeth . . . yah.

Source: From Goodglass, 1979, p. 256.

Neurolinguistics: Experiment methods V

Wernicke's aphasia

- produce very fluent speech
- difficult to make sense of because the words are too general

Box 2.3 Example of speech produced by a patient with Wernicke's aphasia

The patient is responding to the question, "How are you today?": "I feel very well. My hearing, writing been doing well. Things that I couldn't hear from. In other words, I used to be able to work cigarettes I didn't know how . . . Chesterfeela, for 20 years I can write it."

Source: From Goodglass, 1993, p. 86.

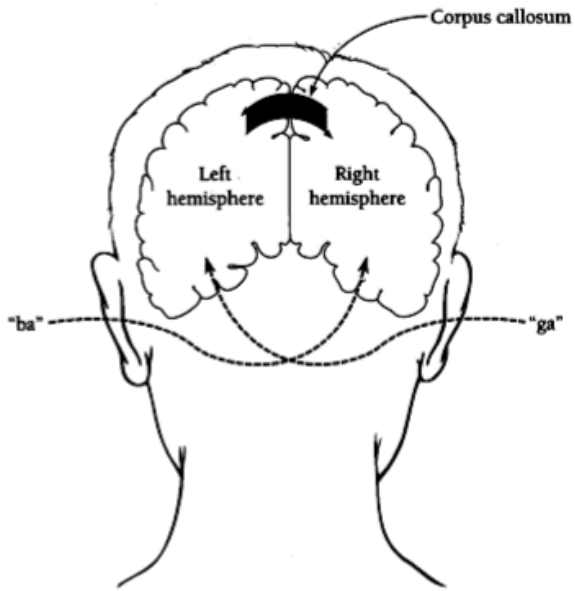
Neurolinguistics: Experiment methods VI

- The cases of aphasia patients show that different language functions (syntax (grammar) and semantics (meaning)) are controlled by the different areas in the brain (the Broca's area for syntax and the Wernicke's area for semantics).

Neurolinguistics: Experiment methods VII

The dichotic listening test

A subject of the experiment sits with a set of earphones and is given two different sound signals simultaneously through each earphone. (e.g., ”ba” from the left ear and ”ga” from the right ear)



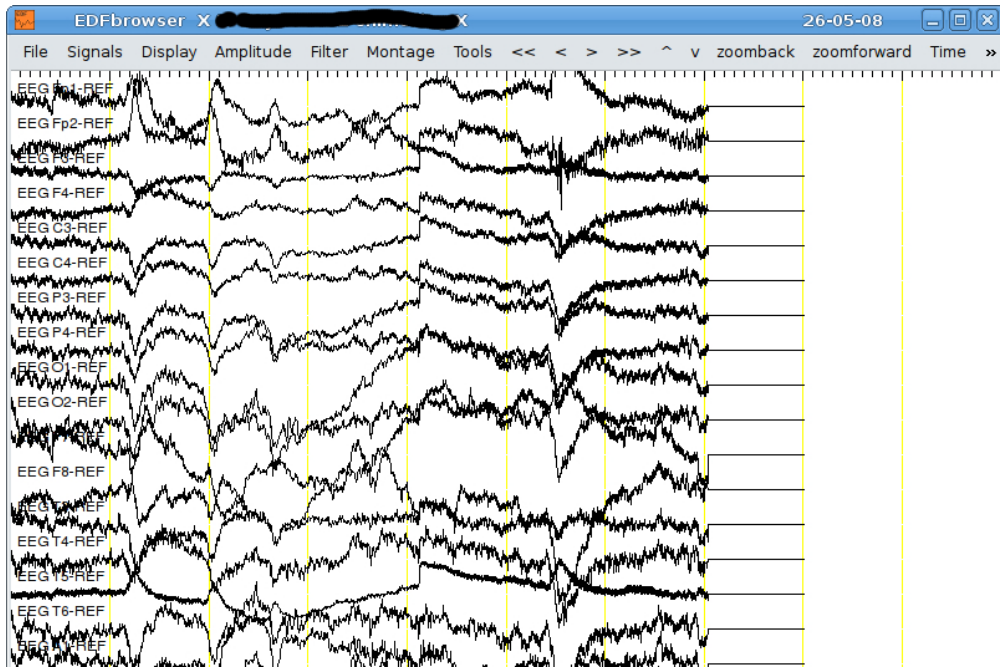
Neurolinguistics: Experiment methods VIII

- ”The right ear advantage” The subject often correctly identifies the sound that came through the right ear (the sounds do not mix). The left hemisphere seems to control the language functions.

Neurolinguistics: Experiment methods IX

The brain imaging techniques: EEG

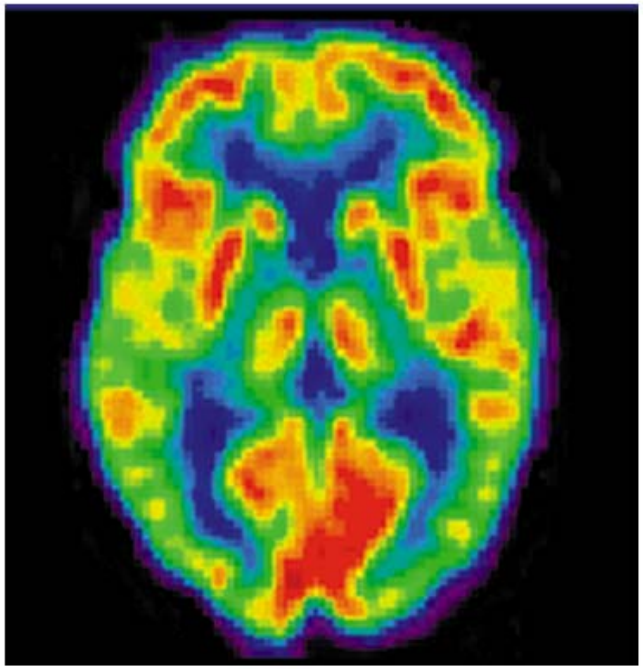
Electroencephalography (EEG) is the recording of electrical activity (voltage fluctuations) along the scalp



Neurolinguistics: Experiment methods X

The brain imaging techniques: PET

Position Emission Tomography (PET scan) shows an brain image through the low-level radioactive gas or glucose with a radioactive substance.



Neurolinguistics: Experiment methods XI

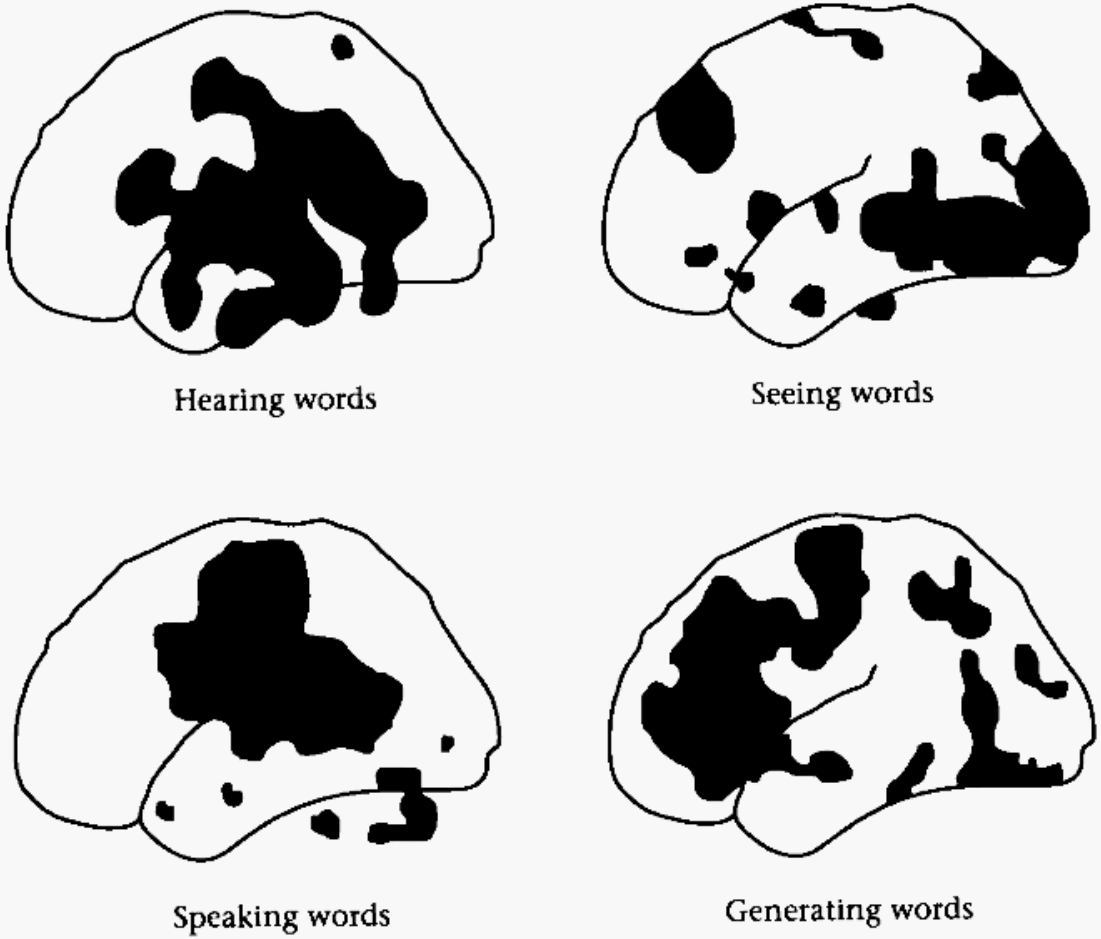
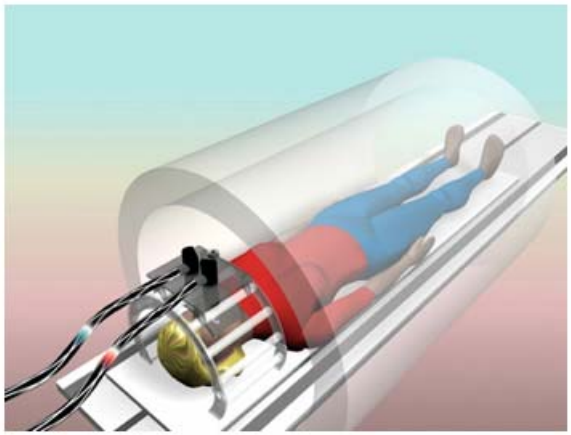


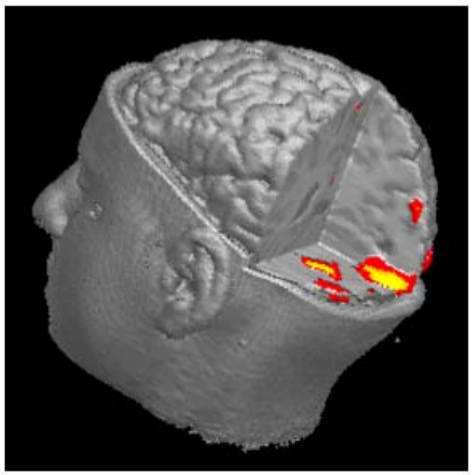
Figure 14.5 PET scans show how blood flow to the brain shifts to different locations depending on which task is being performed.

Neurolinguistics: Experiment methods XII

The brain imaging techniques: MRI & fMRI

(functional) Magnetic Resonance Imaging (MRI & fMRI) captures the image of activities in the brain that result from patterns of blood flow and oxygen consumption.





Neurolinguistics: Experiment methods XIII

Neurolinguistics: Theories I

The localization of the functions in the brain

The majority of research suggest that specific aspects of language functions are localized in different parts of the brain.

- However, there are a number of contradicting findings in those studies. Due to its indirect approach to the brain, the neurolinguistic research remains quite speculative.....?

Neurolinguistics: Theories II

Critical Period Hypothesis (CPH)

- From the clinical data, Lenneberg (1967) proposed a hypothesis that the lateralization of the brain completes at the time of puberty. The brain of children (before puberty) hasn't assigned specialized functions to different areas yet. The CPH argues that the specialization of language abilities will occur only if the child is exposed the appropriate language input before the lateralization.
- The first language acquisition should be triggered within the biologically determined window of the life (that is, before the puberty).

Neurolinguistics: Theories III

- The Critical Period Hypothesis is an intuitively attractive hypothesis. It is commonly thought that
  - Children acquire language very fast, flawlessly, and effortlessly.
  - Adults have hard time learning a (second) language – it will never reach the fluency attained by the child learner?
- The CPH claims that the language acquisition should take place before puberty. (we will see both first language acquisition and second language acquisition to examine this claim)

First language acquisition I

The logical problem of language acquisition (Baker and McCarthy, 1981)

- Without consistent and useful explicit or implicit negative evidence, induction is not possible.
- However, children rarely receive corrective feedback from their caregivers. Even when the caregiver provides corrective feedback, children seem not to use it in a way useful for language acquisition. (Bohannon and Stanowicz, 1988)

Child:	Nobody don't like me.
Mother:	No, say "Nobody likes me."
Child:	Nobody don't like me.
[... Eight repetitions of this dialogue ...]	
Mother:	No, now listen carefully; say "nobody likes me."
Child:	Oh! Nobody don't like me.

First language acquisition II

- Morphological overgeneralization (Pinker, 1989; Braine and Brooks, 1995)
  - *arrive - arrived*
  - *call - called*
  - *go - *goed / went*
  - *throw - *throwed / threw*
  - *mouse - *mouses / mice*
  - *foot - *foots / feet*

First language acquisition III

- Argument-structure overgeneralization (Braine and Brooks, 1995)
  - He kept it. / *He stayed it.
  - I will tell a secret to you. ≈ I will tell you a secret.
  - I will say a secret to you. ≈ *I will say you a secret.
  - Shall I whisper a secret to you? ≈ *Shall I whisper you a secret?
  - Load the truck with hay ≈ Load hay into the truck.
  - *Pour the glass with water ≈ Pour the water into the glass.
  - Fill the glass with water ≈ *Fill the water into the glass.
  - The horse galloped. → The jockey galloped the horse.
  - The monkey somersaulted. → *The clown somersaulted the monkey.

FLA Process I

- Milestones in the First Language Acquisition

before the birth

The unborn babies in the uterus can hear mother's speech.

right after the birth

The a-few-hour-old baby seems to distinguish the speech sounds that exist in mother's native language from the sounds in another language (cf. the sucking procedure)

first few months

Generating sequences of vowel-like sounds, especially high vowels [i] and [u]

FLA Process II

4 months

Developing ability to bring the back of the tongue into the back of the palate and generating velar consonants [k] and [g]

5 months

Distinguishing the difference between [i] and [a] and [ba] and [ga]

6-8 months

Starting sitting up and producing a number of different vowels and consonants

FLA Process III

Table 11.1 Cross-linguistic similarities in babbling

Frequently found consonants	*Infrequently found consonants*
p b m	f v θ ð
t d n	ʃ ʒ tʃ dʒ
k g	l r ŋ
s h w j	

Table 11.4 Deletion of unstressed syllables

Word	*Child's pronunciation*
hip po pó ta mus	[pɑs]
spa ghé tti	[gɛ]
hé li còp ter	[ɛ̀kɑt]
kan ga róo	[wu]

FLA Process IV

6-8 months

Starting sitting up and producing a number of different vowels and consonants as well such as [ba-ba-ba] and [ga-ga-ga]

9-10 months

Generating recognizable intonation patterns to the consonant and vowel combinations [ba-ba-da-da]; Nasal sounds such as [m] and [n] become common; Syllable sequences [ma-ma-ma]/[da-da-da]

10-11 months

The late babbling stage; Being capable of using their vocalizations to express emotions and emphasis. [ma-da-ga-ba]

FLA Process V

12-18 months

One-word stage; Producing recognizable single-unit utterances for everyday objects ”milk”, ”cookie”, ”cat”, ”cup”, ”spoon” etc.

FLA Process VI

Table 11.8 Common items in the first fifty words

Entities
Words referring to people: *daddy, mommy, baby* food/drink: *juice, milk, cookie, water, toast, apple, cake* animals: *dog, cat, duck, horse* clothes: *shoes, hat* toys: *ball, blocks* vehicles: *car, boat, truck* other: *bottle, key, book*
Properties
hot, all-gone, more, dirty, cold, here, there
Actions
up, sit, see, eat, go, down
Personal-social
hi, bye, no, yes, please, thank-you

FLA Process VII

18-20 months

The vocabulary size becomes approx. 50 words

Table 11.16 Semantic relations in children's one-word utterances

Semantic relation	*Utterance*	*Situation*
Agent of an action	*dada*	as father enters the room
Action or state	*down*	as child sits down
Theme	*door*	as father closes the door
Location	*here*	as child points
Recipient	*mama*	as child gives mother something
Recurrence	*again*	as child watches lighting of a match

FLA Process VIII

24 months

A variety of combinations similar to ”baby char” ”mommy eat” ”cat bed” etc.; Producing 200-300 distinct words; Conversational initiative and responsiveness grow

Table 11.17 Some patterns in children's two-word speech

Utterance	*Intended meaning*	*Semantic relation*
Baby chair	'The baby is sitting on the chair.'	agent-location
Doggie bark	'The dog is barking.'	agent-action
Ken water	'Ken is drinking water.'	agent-theme
Hit doggie	'I hit the doggie.'	action-theme
Daddy hat	'Daddy's hat'	possessor-possessed

FLA Process IX

24-30 months

Producing multiple-word speech (telegraphic speech - only lexical morphemes)

30 months

The child's vocabulary expands rapidly and the child is initiating more talk while increasing physical activities such as running and jumping; Incorporating inflectional morphemes - "reading books" "cat sitting" "mommy reading book" "some men" "two feed" "girl's dog"

FLA Process X

Table 11.19 Sample utterances from a child's speech over a 12-month period

Age	*Sample utterances*
28 mos.	Play checkers. Big drum. I got horn. A bunny-rabbit walk.
30 mos.	Write a piece of paper. What that egg doing? I lost a shoe. No, I don't want to sit seat.
32 mos.	Let me get down with the boots on. Don't be afraid of horses. How tiger be so healthy and fly like kite? Joshua throw like penguin.

FLA Process XI

34 mos.	Look at that train Ursula brought.
	I simply don't want put in chair.
	Don't have paper.
	Do you want little bit, Cromer?
	I can't wear it tomorrow.
36 mos.	I going come in fourteen minutes.
	I going wear that to wedding.
	I see what happens.
	I have to save them now.
	Those are not strong mens.
	They are going sleep in wintertime.
	You dress me up like a baby elephant.
38 mos.	So it can't be cleaned?
	I broke my racing car.
	Do you know the lights went off?
	What happened to the bridge?
	Can I put my head in the mailbox so the mailman can know where I are and put me in the mailbox?

FLA: Children's assumptions I

- Initially, children do not distinguish morphologically simple words (e.g., *cat*) from morphologically complex words (e.g., *cats*). Children learn all words as unanalyzed chunks or *amalgams*.
- Signs of children's knowledge about grammatical morphemes
  - Overgeneralization errors
  - *Wug* test
  - *Sibbing* test

FLA: Children's assumptions II

Overgeneralization errors

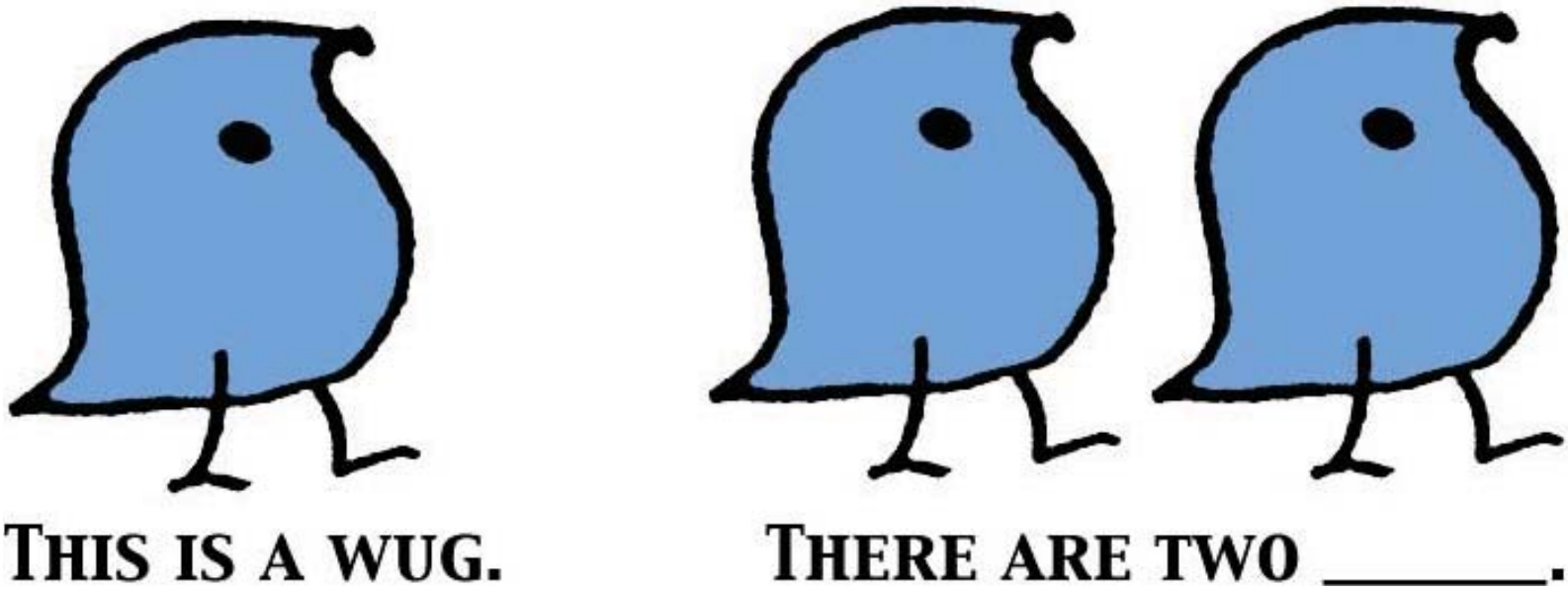
- **foots* = children applied the regular plural morpheme *-s* to an irregular plural word *foot*
- **eated* = children applied the regular past morpheme *-ed* to an irregular past verb *eat*

- Those errors suggest that children know the function or meaning of the bound morphemes *-s* and *-ed*.

FLA: Children's assumptions III

Wug test

If children answer *wugs* /w□gz/, it demonstrates their knowledge about English plural *-s* (in addition, the phonological rules that apply to it)



FLA: Children's assumptions IV

Sibbing test

What are (1) *sibbing*, (2) *some pak*, and (3) *the moop*?

FLA: Basic-level hypothesis I

- Three strategies for acquiring word meanings (a.k.a. Basic-level hypothesis)

The whole object assumption

A new word refers to a whole object

The type assumption

A new word refers to a type of a thing, rather than a particular thing

The basic level assumption

A new word refers to types of objects that are alike in basic ways

FLA: Basic-level hypothesis II

- Children understand that *rabbit* refers to
  - a rabbit rather than *whiteness* or *wooliness*
  - a rabbit as a kind rather than this particular rabbit.
  - a rabbit rather than all other white four-legged animals

FLA: Basic-level hypothesis III

- Children do make overextension errors
  - *dog* = ”hourse” and ”cow” (all four-legged animals)
  - *ball* = ”balloon” and ”a small stone” (all round-shape objects)
  - *moon* = ”grapefruit halves” and ”crescent-shaped car light”

FLA: Development of syntax I

- Development of syntax

18-26 months (Syntax stage 1)

- Question forming
  - simply adding wh-forms to the beginning of the expressions with a rising intonation
  - ”where kitty?” ”doggie?” ”where house go?” ”sit chair?”
- Negation forming
  - putting ”no” or ”not” at the beginning
  - ”no mitten” ”not a teddy bear” ”no fall”

FLA: Development of syntax II

22-30 months (Syntax stage 2)

- Question forming
  - more complex expressions with intonation strategies
  - ”where book have?” ”you want eat?” ”why you smiling?” ”see my doggies?”
- Negation forming
  - ”don’t” and ”can’t” appear and ”not” and ”no” increasingly appear in front of the verb
  - ”he no bite you” ”I don’t want it” ”that not mommy” ”you can’t dance”

FLA: Development of syntax III

24-40 months (Syntax stage 3)

- Question forming
  - the inversion of the subject and the verb?
  - ”can I have a piece?” ”did I caught it?” ”will you help me?” ”how that opened?” ”what did you do?” ”why kitty can’t stand up?”
- Negation forming
  - the incorporation of the auxiliary forms
  - ”didn’t” and ”wasn’t” (”isn’t” appears very late) I didn’t caught it” ”he not talking it” ”she won’t let go” ”this no ice cream”

SLA: Definitions I

FLA (first language acquisition)

The language acquisition as his/her native language(s) (which doesn't need to be only one)

SLA (second language acquisition)

The language acquisition as his/her second language(s) (usually after puberty)

Learning

Using a general cognitive learning mechanism (e.g., memory, association, indiction/deduction etc.)

SLA: Definitions II

Acquisition

Using a mechanism that is specific for language (language-acquisition device or LAD)

SLA: Definitions III

Critical Period Hypothesis / Fundamentally Different Hypothesis

A theory arguing that language acquisition will never happen after the critical period (roughly at the age of 10-13 or puberty) → A second language learner never becomes like a native speaker

UG (full-)access hypothesis

A theory arguing that second language acquisition is fundamentally the same as the first language acquisition → A second language learner eventually becomes like a native speaker

SLA: Definitions IV

Performance

Extra-linguistic factors such as nervousness, fatigue, motor control of the vocal tracts, and memory capacity

Competence

Purely linguistic ability independent of any performance factors

- Crucial questions in SLA
  - Everyone learns at least one language no matter what.
  - First language acquisition vs. Second language acquisition → Why is it so difficult to learn a second language as an adult?

SLA: Differences from FLA

- Expected learning time for English speakers (from the Foreign Service Institute of the US Department of State (Jackson and Kaplan, 1999))

Language categories	weeks	hours
Category I: Languages closely cognate with English: *French, German, Italian, Portuguese, Romanian, Spanish, Swedish, Dutch, Norwegian, Afrikaans, etc.*	23-24	575-600
Category II: Languages with significant linguistic and/or cultural differences from English: *Albanian, Amharic, Azerbaijani, Bulgarian, Finnish, Greek, Hebrew, Hindi, Hungarian, Icelandic, Khmer, Latvian, Nepali, Polish, Russian, Serbian, Tagalog, Thai, Turkish, Urdu, Vietnamese, Zulu, etc.*	44	1100
Category III: Languages that are exceptionally difficult for native English: *Arabic, Chinese, Japanese, and Korean*	88	2200

SLA: Unique factors in SLA I

- What are the factors that divide SLA from FLA?
  - Age
  - Cognitive skills (e.g., generalization, induction, memory etc.)
  - Motivation (e.g., intrinsic or extrinsic motivation)
  - Self-identity (e.g., Americanized?)
  - Initial state (if the learner speaks any language or not)
  - Final state (how fluent one becomes)
  - Path (the process of learning; taking class or on the street?)
  - Input (quality and quantity of exposure to the target language)

- Some of the differences typically associated with SLA may not be true.

SLA: Unique factors in SLA II

- Influence of Age
  - Johnson & Newport tested English proficiency attained by 46 native Korean or Chinese speakers who had arrived in the United States between the ages of 3 and 39 (Johnson and Newport, 1989)
  - English proficiency is measured with 12 basic English rules such as
    - Omission of past-tense morpheme *-ed*, plural morpheme *-s*, irregular morpheme etc. (e.g., **The farmer bought two pig at the market*)
    - Case (e.g., **Susan is making some cookies for we*)
    - Auxiliary verb (e.g., **Fred will be get a raise next month*)
    - Yes-no question (e.g., **Can ride the little girl a bicycle*?)
    - etc...

SLA: Unique factors in SLA III

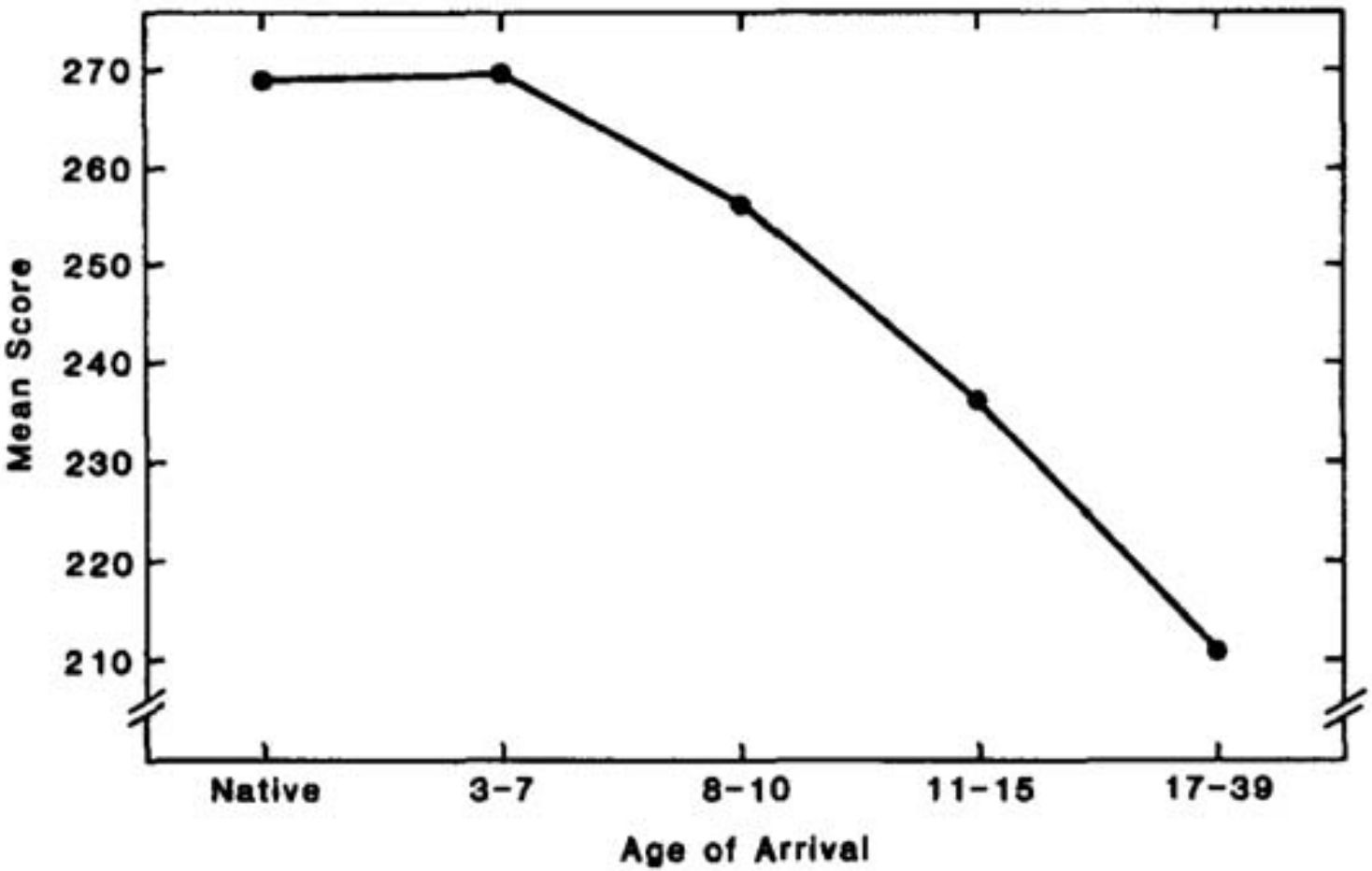


FIG. 1. The relationship between age of arrival in the United States and total score correct on the test of English grammar.

SLA: Unique factors in SLA IV

- Influence of Age
  - A strong correlation between age of arrival (especially before/after puberty) and English proficiency
  - This age effect was not affected by other factors such as amount of experience with English, motivation, self-consciousness, or American identification

Bibliography I

Baker, C. L. and McCarthy, J. (1981). *The logical problem of language acquisition*. MIT Press, Cambridge, Mass.

Bohannon, J. N. and Stanowicz, L. (1988). The issue of negative evidence: Adult responses to children's language errors. *Developmental Psychology*, 24(5):684–689.

Braine, M. and Brooks, P. J. (1995). Verb argument structure and the problem of avoiding an overgeneral grammar. In Tomasello, M. and Welsberger, M. J., editors, *Beyond Names for Things*, chapter 13, pages 353–376. Lawrence Erlbaum, Hillsdale, New Jersey.

Jackson, F. and Kaplan, M. A. (1999). Lessons learned from fifty years of theory and practice in government language teaching. In Altis, J. and Tan, A.-H., editors, *Proceedings of Gerogetown University Round Table on Language and Linguistics*, pages 71–87, Washington, D.C. Georgetown University, Georgetown University Press.

Johnson, J. and Newport, E. L. (1989). Critical period effects in second language learning: The influence of maturational state on the acquisition of ESL. *Cognitive Psychology*, 21:60–99.

Pinker, S. (1989). *Learnability and Cognition*. MIT Press, Cambridge.

Yule, G. (2010). *The Study of Language*. Cambridge University Press, New York, NY, 4th edition. ISBN: 9780521749220; Course: ELL101 (textbook); Price: $29.99.

This presentation slide was created with LaTeX and *beamer* LaTeX style.