Sign Language

Issues in sign language:

1. Language typically oral with innate basis.
What happens with visual-spatial language - same or different properties?

2. Neurological basis - Do same or different brain areas underlie the acquisition of sign and spoken language

3. Effects of delayed acquisition - Critical period for acquisition of sign? Often delayed exposure for deaf

Similarities and Differences between Spoken Language and Sign

Differences:

1. Iconicity of signs - some signs have elements that directly represent some aspect of concept being referred to:

tree, I, you, give

But iconic sign may vary across languages.

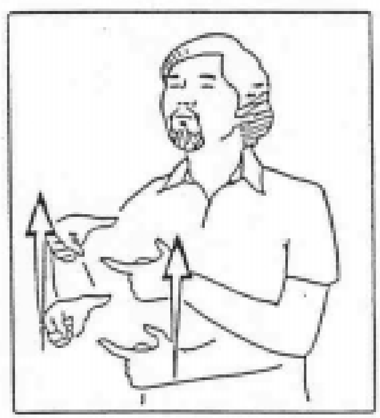
2. Spatial aspect not present in spoken language
Son, daughter locations in space that may be referred to

3. Role of gesture, expressiveness - seems exaggerated
Why might this be the case?

A) "Conventional" lexical items: The sign for *tree* in three different sign languages:

.American Sign Language

Danish Sign Language



Chinese Sign Language

Similarities

1. Phonology - something equivalent to distinctive features
changing shape, position, movement changes sign
(like voicing, place, manner)
“slips of the hand” - anticipate later phonological component

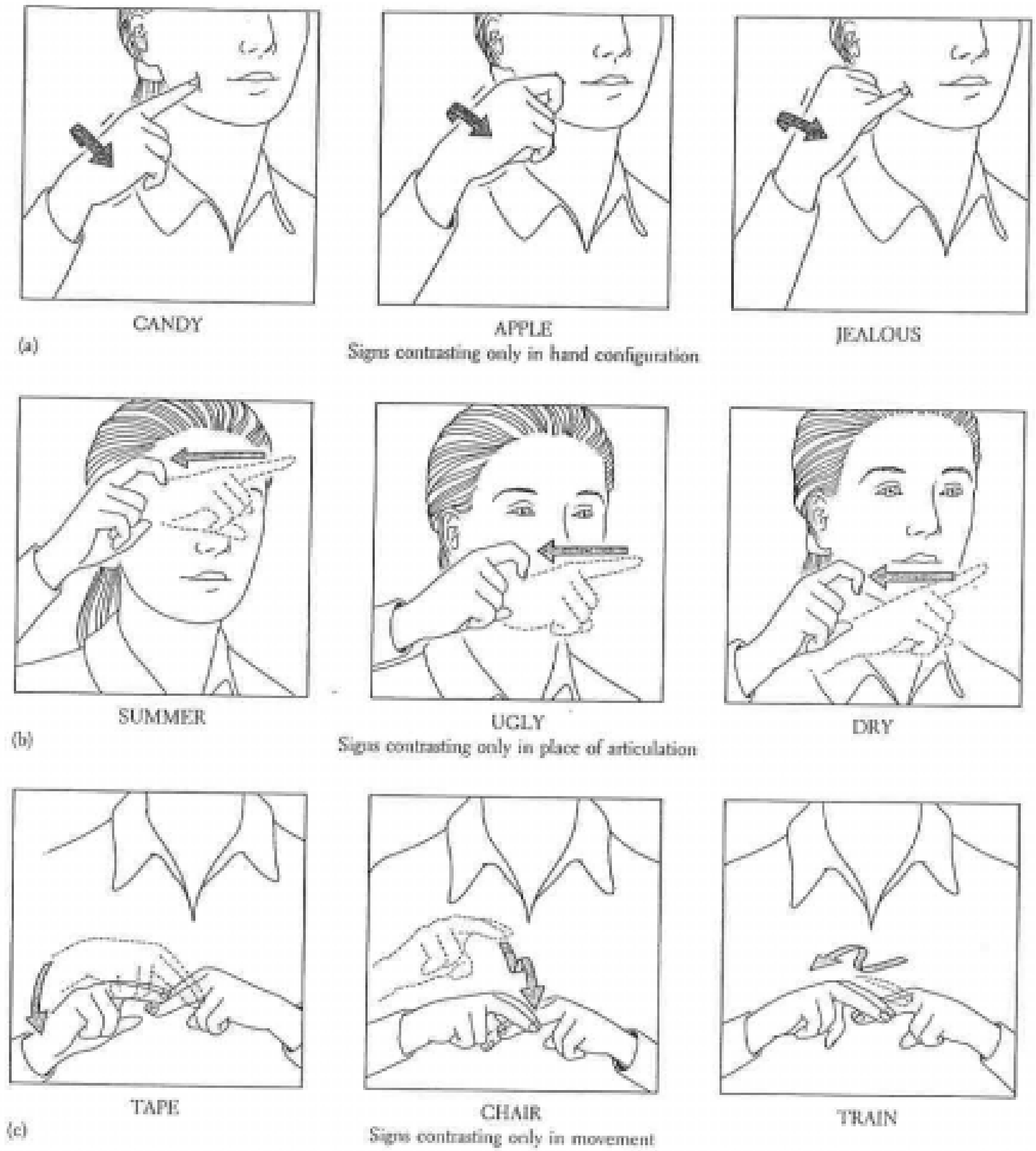
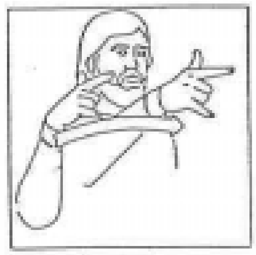


Figure 2-4. Minimal contrasts of signs illustrating major parameters. (From E. S. Klima and V. Bellugi, *The Signs of Language.* Cambridge, MA: Harvard University Press, 1979.)



5a. FLY

5b. AIRPLANE

5c. SWEEP

5d. BROOM

5e. IRON (V)

5f. IRON (N)

SIT

CHAIR

Slips of the hand

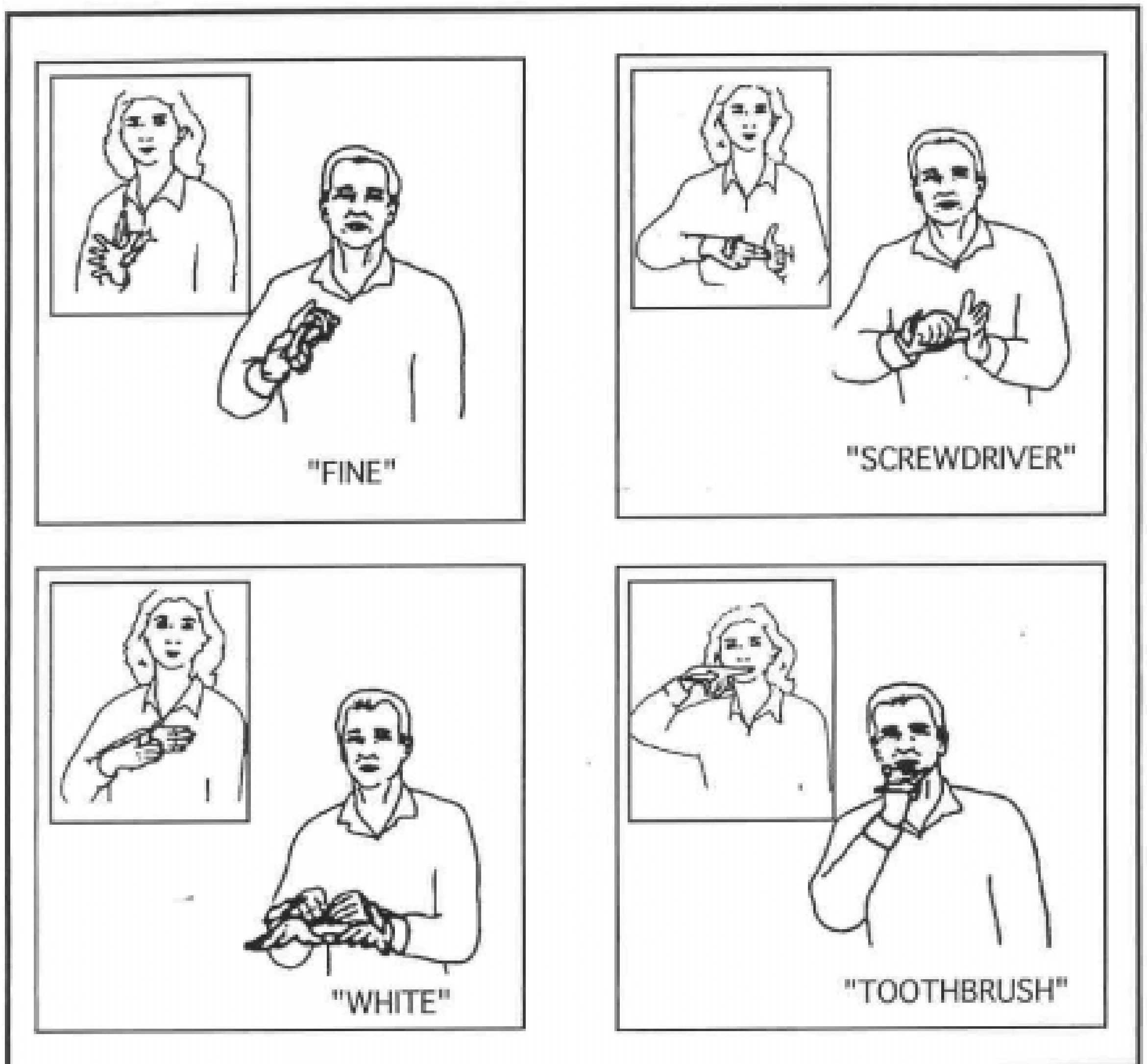


Figure 2 WL's Handshape-specific errors. Examples of sign language phonemic paraphasias in patient WL. Most of WL's errors consisted of incorrect selection of handshapes with correct place of articulation and movement. Copyright, Dr. Ursula Bellugi, The Salk Institute, La Jolla, California. Reprinted with permission.

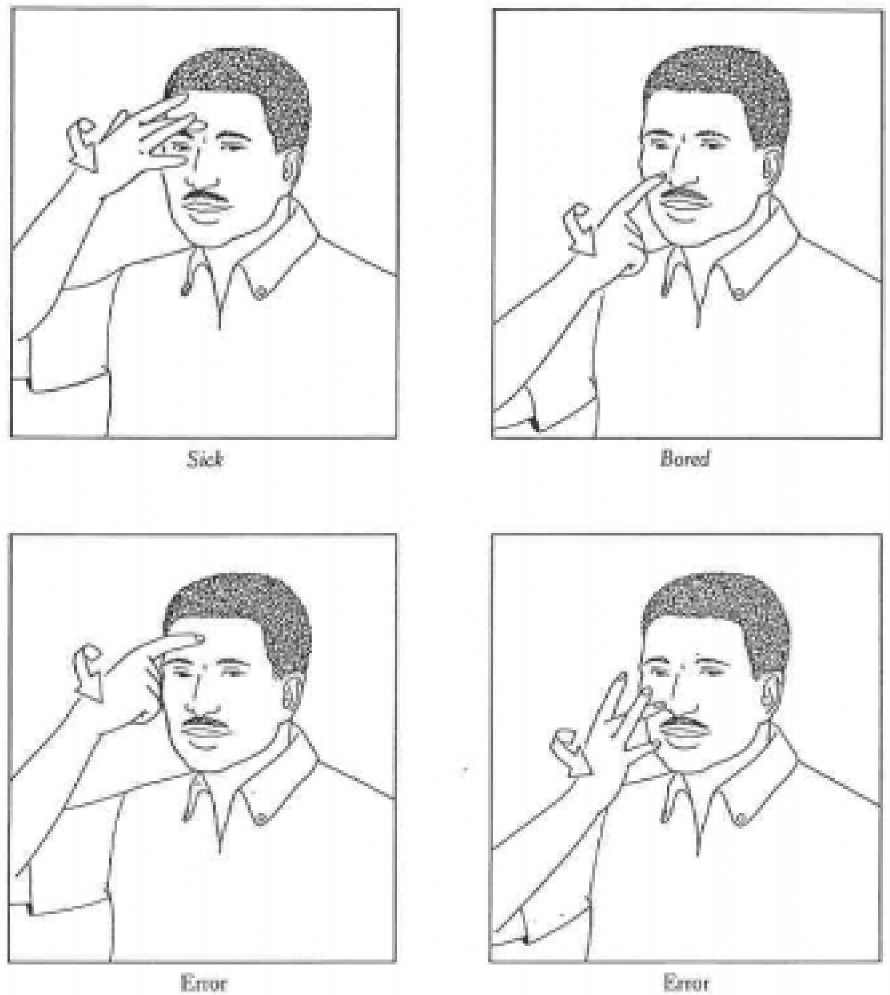


Figure 8-4. Errors of hand configurations. [From D. Newkirk, E. S. Klima, C. C. Pedersen, and U. Bellugi, "Linguistic Evidence from Slips of the Hand," in V. A. Fromkin (ed.), *Errors in Linguistic Performance.* New York: Academic Press, 1980, pp. 165–197.]

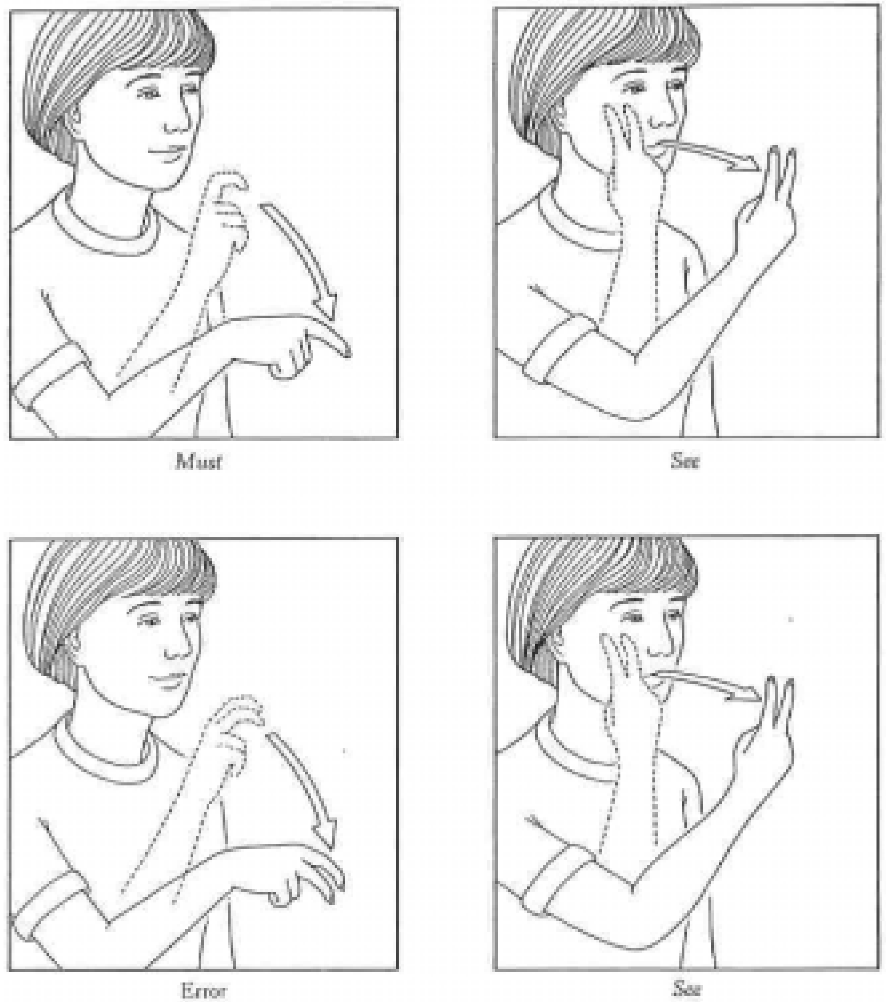
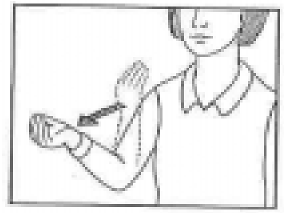


Figure 8-5. Hand configuration feature errors. [From D. Newkirk, E. S. Klima, C. C. Pedersen, and U. Bellugi, "Linguistic Evidence from Slips of the Hand," in V. A. Fromkin (Ed.), *Errors in Linguistic Performance.* New York: Academic Press, 1980, pp. 165–197.]

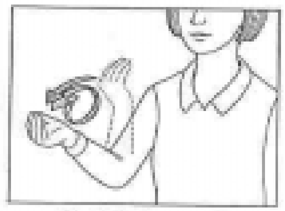
Similarities (cont)

2. Verb inflections - richer than in English, but like some other spoken language - give again, give to each, give to each repeatedly.
Tense - indicated by time something occurred or “finished” added

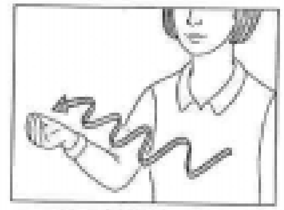
3. Word order - SVO typical



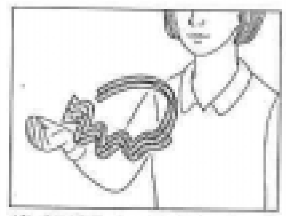
(a) GIVE (uninflected)



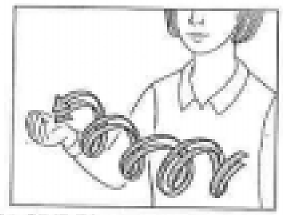
(b) GIVE [durational]
(give continuously)



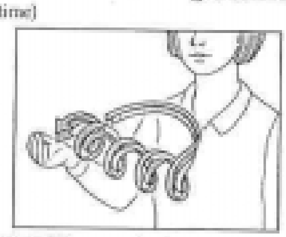
(c) GIVE [exhaustive]
(give to each)



(d) GIVE [[exhaustive] durational]
(give to each, that action recurring over time)

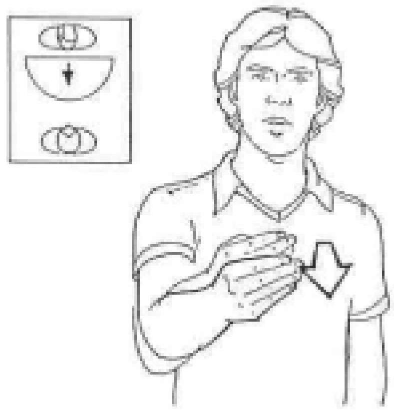


(e) GIVE [[durational] exhaustive]
(give continuously to each in turn)

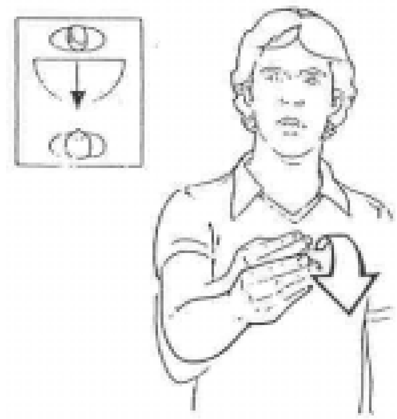


(f) GIVE [[[durational] exhaustive] durational]
(give continuously to each in turn, that action recurring over time)

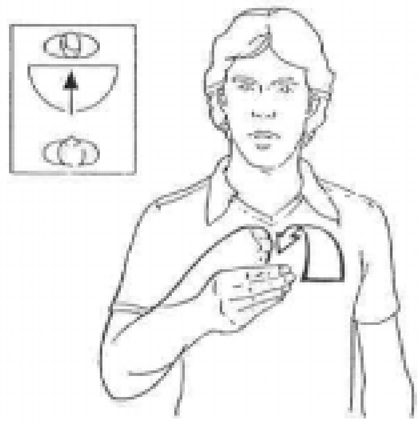
Figure 2-5. Recursive nesting of morphological processes in ASL. (a) The uninflected sign *give.* (b, c) *Give* under single inflections. (d) One combination of inflections (exhaustive in durational). (e) Another combination of inflections (durational in exhaustive). (f) Recursive applications of rules (durational in exhaustive in durational). (From H. Poizner, E. S. Klima, and U. Bellugi, *What the Hands Reveal about the Brain.* Cambridge, MA: MIT Press, 1987.)



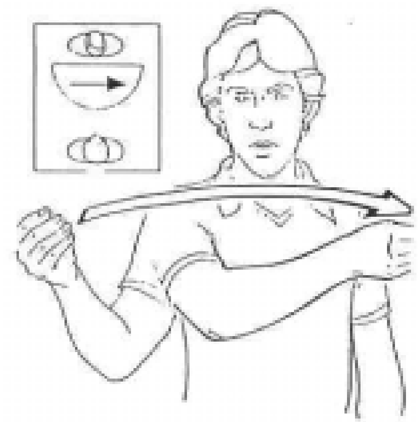
GIVE: citation form



"I give you."



"You give me."



"He gives her."

Neurological basis:

1. Sign language aphasia

For spoken languages, left hemisphere specialization - Broca's, Wernicke's areas
Rt. Hemisphere involved higher level discourse aspects
Sign spatial - is rt. hemisphere more involved?

Studies by:
Bellugi, Lima and many trained by this lab (Poizner, Corina) examined patients who were brain-damaged signers

Left hemisphere also underlies most obvious sign language deficits

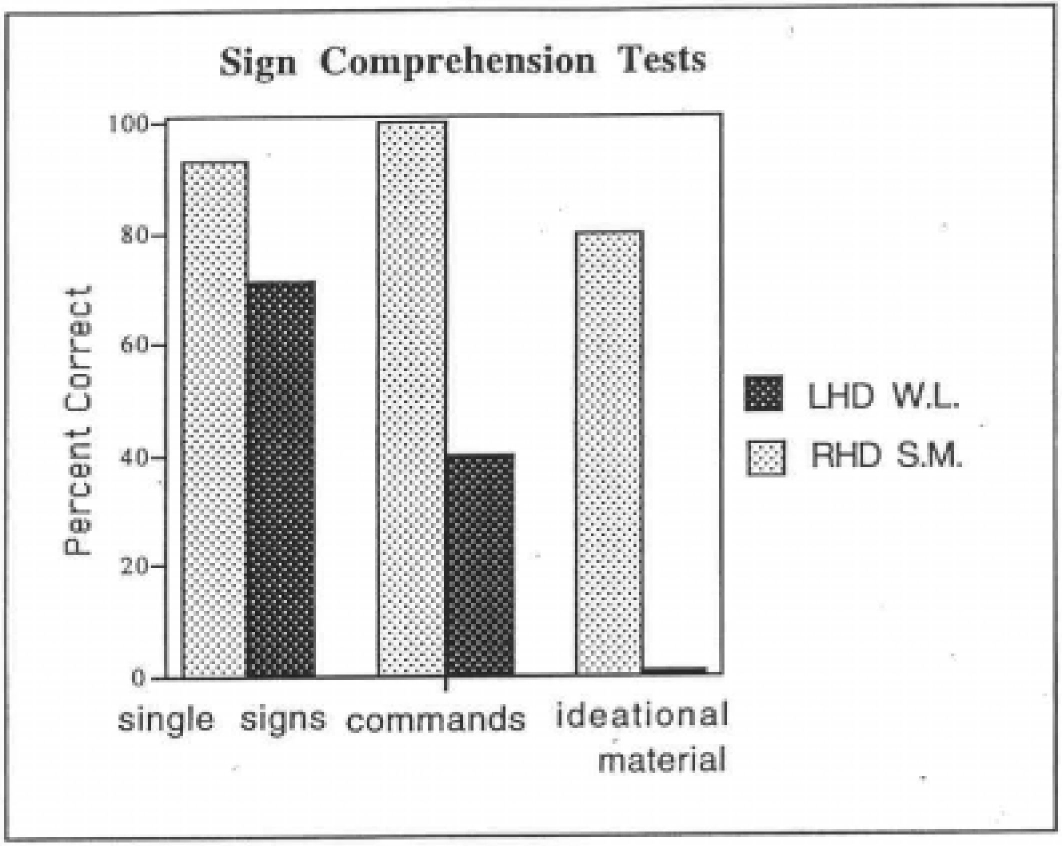


Figure 1 Sign language comprehension data comparing left hemisphere-damaged signer WL with a right hemisphere control subject SM. Comprehension measures are from the Salk Institute adaptation of the Boston Diagnostic Aphasia Examination (Goodglass & Kaplan, 1972). Single sign comprehension requires patients to match a sign to a picture, with appropriate target and foils (e.g., SHOW-ME TREE). The command test requires subjects to follow one-, two-, or three-part commands (e.g., POINT-TO DOOR, FINISH, POINT-TO TABLE). Ideational questions ask patients to judge the truthfulness of complex sentences (e.g., Will a rock float on water?).

Subtle differences - motor areas near hand, arm rather than mouth. Posterior lesions not exactly the same.
(BUT - localization in oral language users not that precise)

2. Neuroimaging (PET, fMRI)

Neville et al. study

English (written)	Signed language
Sentences	Sentences
Consonant strings	Nonsense signs

Three groups:
Hearing SS
Deaf, native signers
Hearing, native signers (hearing children of deaf parents)

Results (subtraction of sentence-nonsense):

Hearing:
Traditional left hemis. language areas for spoken.
No activation difference for signed sentence vs. nonsense

Deaf, native signers:
Traditional left + rt. Hemisphere areas for signed sentences
Rt. Hemisphere for English (!) - may use visual-spatial in reading

Hearing, native signers:
Similar to deaf for sign (left + right)
Left hemisphere activation for English -
due to better acquisition of English than for deaf?

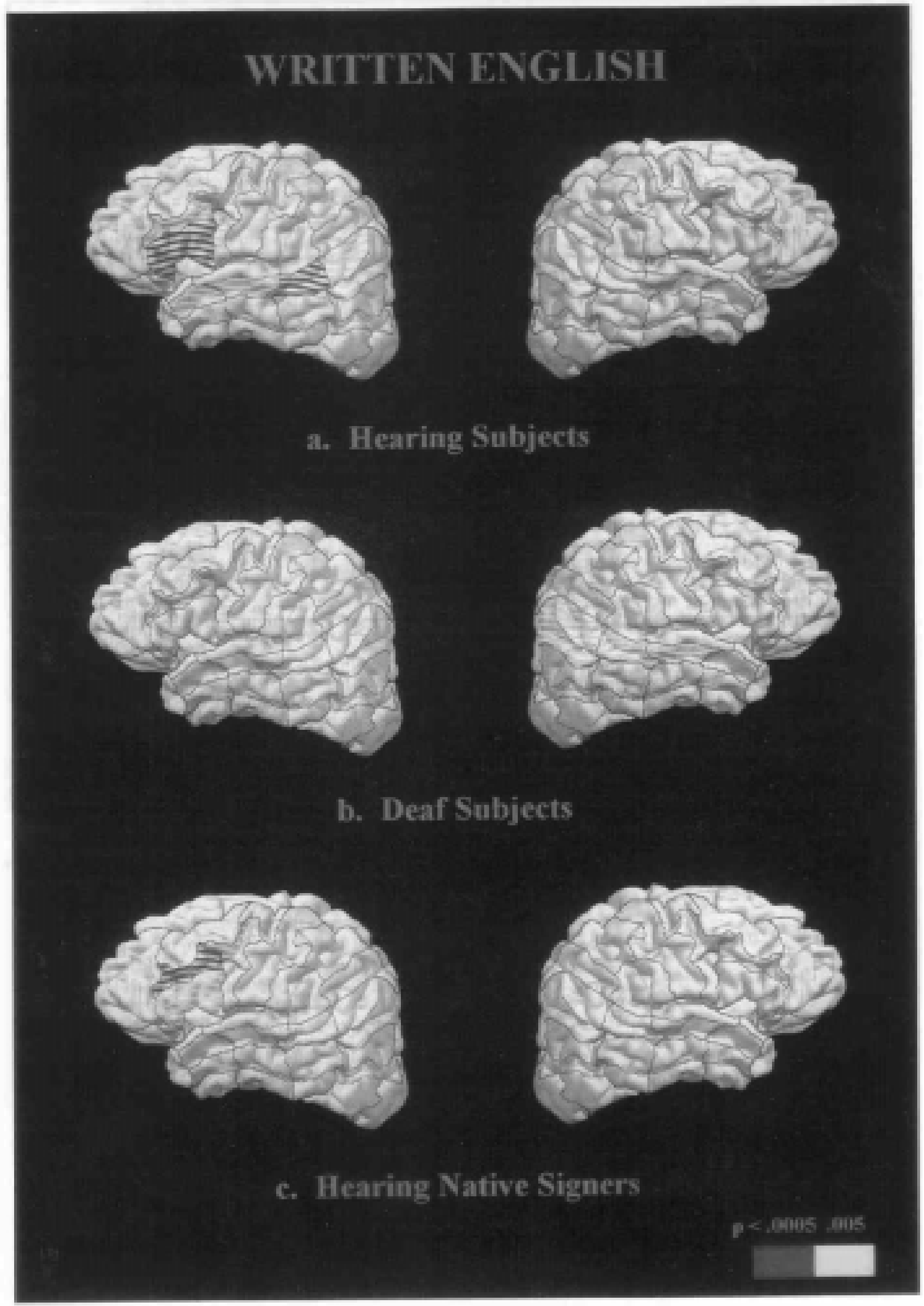


FIG. 1. Cortical areas displaying activation ($P < .005$) for English sentences (vs. nonwords) for each subject group.

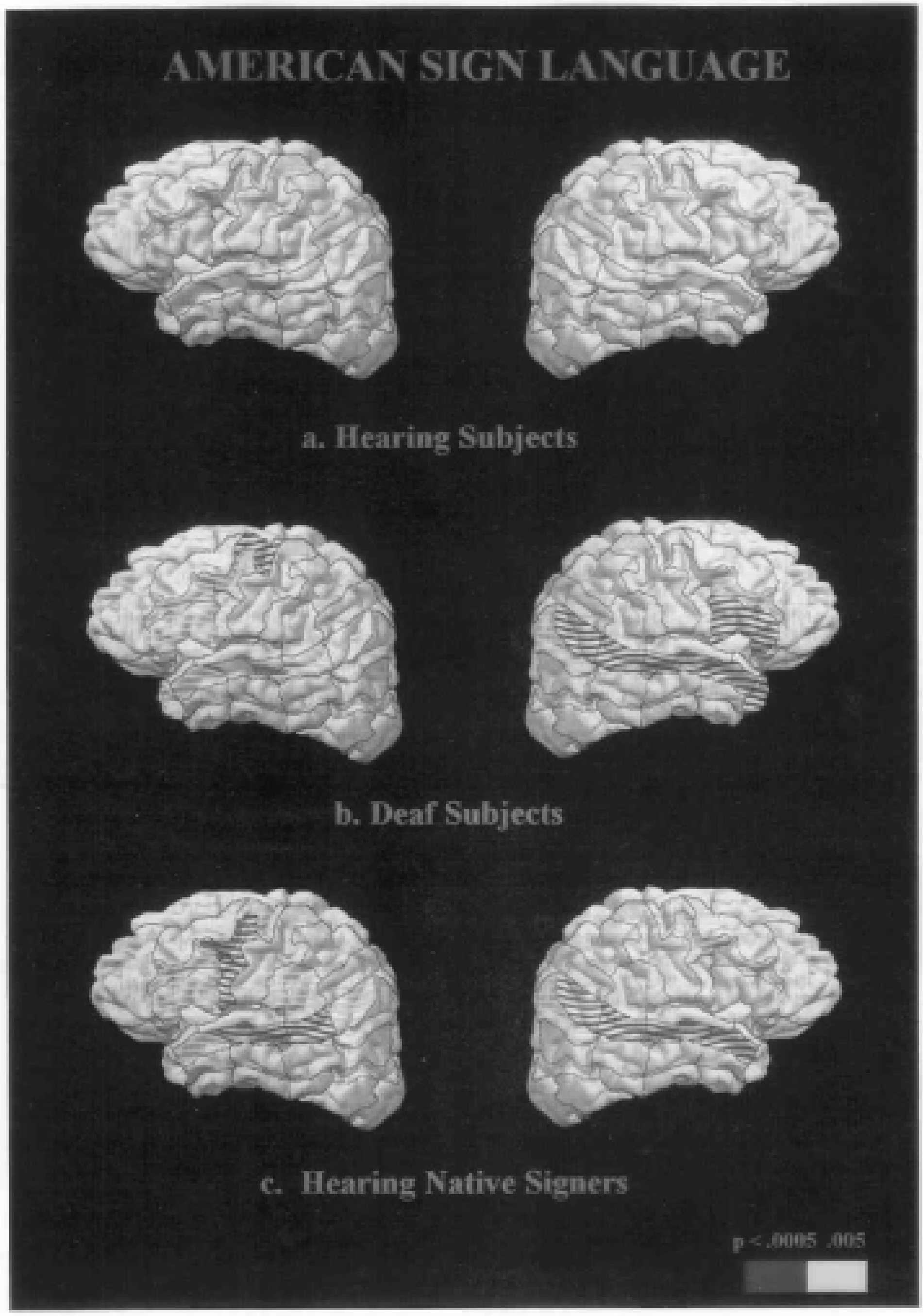


FIG. 2. Cortical areas displaying activation ($P < .005$) for ASL sentences (vs. nonsigns) for each subject group

Figure 5. ASL sign for TREE is produced by a three-year-old child. The standard form of this sign is shown in the drawing at left. The child's sign differs slightly from the adult form but is still fully intelligible. Such discrepancies are typical of the signing of young children, just as speaking children at the same age have not achieved perfect pronunciation. Note that the child is signing with the left hand; ASL signs are not specifically left- or right-handed. (Photograph by Brian C. Price of the University of Texas at Austin; drawing by Frank A. Paul, from *A Basic Course in American Sign Language*, by Tom Humphries, Carol Padden and Terrence J. O'Rourke, T. J. Publishers, Inc., 1980.)

Figure 1. A child gives fluent expression to her thoughts in American Sign Language (ASL), the primary language of the deaf community in the United States and Canada. The sign being made has the meaning NOT. Because the language-learning environment of deaf children differs fundamentally from that of hearing children, the linguistic experiences of deaf children can offer valuable insight into the process of language acquisition. (Photograph © 1989 by George Ancona; reproduced with permission from *Handtalk Zoo*, by George Ancona and Mary Beth, Macmillan Publishing Company.)

Critical Period?

1. In spoken language users-
Abuse cases - no language exposure until teenage years
Very minimal language abilities - single words, no syntax

Problems with interpretation?

2. Deaf children of hearing parents -
No abuse or retardation to worry about
Many don’t get sign language until 5-6 yrs old

Newport & Supalla (1980) -
Three groups of signers - 30 yrs of sign experience:
1. Native signers (birth - children of deaf parents)
2. Learned at age 4-6
3. Learned after age 12

Results:

1. All used correct word order

2. Morphological aspects (inflections):

Competence depended on age of acquisition