

# Sign Languages

Sign languages (alternatively, signed languages) are human languages whose forms consist of sequences of movements and configurations of the hands and arms, face, and upper torso. Typically, sign languages are perceived through the visual mode. Sign languages thus contrast, of course, with spoken languages, whose forms consist of sounds produced by sequences of movements and configurations of the mouth and vocal tract. More informally, then, sign languages are visual-gestural languages, whereas spoken languages are auditory-vocal languages.

Most linguistic research has focused on spoken languages. Indeed, for many years all human languages were mistakenly believed to be spoken languages; signed languages (for example, those used by deaf people interacting with one another) were thought either to be pantomime or to be simple gestural codes representing the surrounding spoken language. However, recent linguistic work has shown these beliefs to be incorrect: natural signed languages show all the structural properties of other human languages yet have evolved independently of the spoken languages that surround them.

Signed languages typically appear as the primary communication systems of people for whom the use of spoken languages is blocked, either by deafness or muteness. The best-known sign languages are used by profoundly deaf people, but sign languages have also been noted (though less well studied) in non-deaf members of occupational or cultural groups where hearing or speaking is impossible (e.g., sawmill workers, monks taking vows of silence, cultures where speech is prohibited for long periods during mourning or surrounding puberty; Johnson 1978; Kendon 1988). Under any of these circumstances, sign languages appear to arise quite commonly: probably every known group of nonspeaking deaf people observed around the world uses some sign language, and even isolated deaf individuals have been observed to develop a sign language to communicate with hearing relatives and friends (Goldin-Meadow and Mylander 1984; Coppola et al. 1997). Thus, although it is probably fair to say that the auditory-vocal (spoken) medium is biologically dominant for language in humans (in the sense that all groups for whom spoken language is viable seem to choose this medium), the visual-gestural (sign) medium is a robust, and therefore biologically normal, alternative.

One important distinction is between "natural sign languages" and "devised or derivative sign languages." Natural sign languages are those that have arisen spontaneously through time by unrestricted interactions among people who use them as a primary communication system. These are the sign languages on which most linguistic research has focused, because they offer the clearest evidence about the natural tendencies of humans to develop communicative structure in the visual-gestural mode. The natural sign languages of deaf communities are typically named by the region in which they have evolved -- for example, American Sign Language (used in the United States and parts of Canada), British Sign Language (used in Great Britain), French Sign Language/Langue des Signes Française (used in France).

In contrast, devised or derivative sign languages (perhaps more properly termed "sign systems") are those that have been intentionally invented by some particular individuals (e.g., educators of deaf children), typically not the primary users of the language, and whose structures are often based directly on a spoken language. These devised systems are typically named by the spoken language on which they are based. One example is a set of sign systems devised by educators of the deaf in the 1970s to represent spoken English, known as Manually Coded English (similar but slightly different variants of MCE are called Signing Exact English, Seeing Essential English, and Linguistics of Visual English). Because these devised systems are invented by committees, rather than arising spontaneously among users, they do not offer the opportunity to observe the unfettered natural tendencies of humans to develop gestural languages. In fact, these sign systems studied by linguists

tendencies of humans to develop gestural languages. In fact, those sign systems studied by linguists have been found to violate the universal structural principles of both spoken and signed natural languages (even though the systems are intended to match a particular spoken language), probably because the inventors were unfamiliar with linguistic principles and performed their invention process outside of the implicit constraints and forces of the (natural) processing circumstances in which natural languages evolve. One interesting finding concerning these devised languages is that, presumably because of violating natural structural principles for human languages, children do not readily acquire these languages (Supalla 1986, 1990). Therefore use of these devised systems tends to be confined to the classrooms in which their use is required and does not spontaneously spread to a wider community or to broader employment in everyday communication.

As noted above, most research has focused on natural sign languages, asking whether natural sign languages are organized and learned in ways that are similar to or different from natural spoken languages. The largest amount of linguistic and psycholinguistic research on natural sign languages has been conducted on American Sign Language (Stokoe, Casterline, and Cronbach 1965; Klima and Bellugi 1979; Siple and Fischer 1990). More recent research has begun to investigate other natural sign languages, to compare unrelated sign languages to one another in an attempt to determine the universal properties and the range of language variation across sign languages, and to compare the outcome to that found in crosslinguistic research on spoken languages (Supalla 1997). Although our knowledge of American Sign Language is fairly detailed, our understanding of other signed languages and also of sign language universals is just beginning.

Like research on other languages, research on American Sign Language (ASL) focuses primarily on its structure, use, and acquisition among those signers for whom it is a native language, acquired from exposure in the home from earliest infancy. These are typically congenitally and profoundly deaf individuals whose parents are also deaf and who themselves acquired ASL early in life. (In contrast to spoken language communities, these native users are very rare and constitute only about 5 percent of the signing community.) Linguistic analyses of (natively acquired) ASL have revealed that it is a language with a quite different type of structure than that of English, but one that is found among other spoken languages (for example, it shares certain typological similarities with Navajo). Word structure in ASL is quite complex, particularly in verbs. Typical verbs are marked morphologically for agreement in person and number with both subject and object, and for temporal aspect and other grammatical features common to verbs in other languages. Verbs of motion are particularly complex, with stems involving morphemes for path, manner of motion, orientation, and classifier morphemes marking the semantic category or size and shape of both the moving object and a secondary object with respect to which the movement path occurs. As is common in spoken languages with complex MORPHOLOGY, word order in ASL is relatively free, with an unmarked SVO order but a number of ordering-changing syntactic structures commonly used (e.g., topicalization of the object, subject, or VP). Moved constituents are obligatorily marked by grammaticized facial expressions, which are produced throughout the signing of the words of that constituent. When verbs are marked for agreement and/or when discussing subjects and objects which have already been mentioned, both the subject and the object NP may be omitted from the sentence (i.e., the language permits null arguments). In short, the grammatical properties of ASL are unlike those of English, but are quite familiar to students of other languages of the world. This body of findings thus suggests that principles of word and sentence structure are, at least to some degree, common to both signed and spoken languages and are not inherently connected to the auditory-vocal mode.

Studies of the on-line processing of ASL by fluent adult signers, of the representation of ASL in the brain, and of the acquisition of ASL by native-speaking deaf children also show many similarities with the principles of processing, neurological organization, and acquisition of spoken languages of the world. For example, ASL is acquired on approximately the same timetable as spoken languages with similar TYPOLOGY. Acquisition begins with manual babbling appearing at around 10 months or earlier (Petitto and Marentette 1991); first signs appear at about one year of age; two-sign sentences appear during the second year; and each of these stages show structural characteristics like those of other languages (Meier and Newport 1990; Newport and Meier 1985). Adult signers process ASL using the same types of parsing strategies as those used in the processing of spoken languages (Emmorey 1991) and, like speakers of auditory-vocal languages, represent ASL in the left hemisphere of the brain (Poizner, Klima, and Bellugi 1987; Neville 1995).

As noted earlier, a highly unusual feature of signing communities is that native users are so rare; 95

percent or more of deaf signers are first exposed to their language beyond infancy and sometimes not until late childhood or even adulthood. These demographics result from the fact that most deaf children are born into hearing families and also from the fact that, until recently, hearing parents were often discouraged from learning sign language in the hopes that avoidance of sign language and therapeutic presentation of speech would result in improved spoken-language acquisition. Research does not suggest, however, that the avoidance of sign languages does improve speech abilities; in fact, much evidence suggests that, among the profoundly deaf, better speech, lipreading, and reading abilities are shown by native signers (Meadow 1966) and, more generally, that spoken language abilities depend much more on the ability to hear than on the availability (or avoidance) of signing (Jensema 1975; Quigley and Paul 1986). In recent years, it has therefore begun to be more common practice to encourage hearing parents of deaf children to learn to sign, and to expose deaf children to sign languages from early in life.

In the meantime, however, the presence of a large number of signers who have acquired their primary language beyond infancy has presented an unusual research opportunity: the study of the effects of age of exposure on the mastery of a primary language. A number of such studies have shown that there is a substantial effect of age on the acquisition of ASL: native and early ASL learners show much more fluency, consistency, and complexity in the grammatical structures of the language, and more extensive and rapid processing abilities, than those who have acquired ASL later in life (Emmorey 1991; Mayberry and Fischer 1989; Newport 1990). These effects persist even after as much as 50 years of daily use of ASL as a primary language (Newport 1990). Together with the work of Lenneberg (1967) and Curtiss (1977), and also comparable effects of age of exposure on the acquisition of English as a second language in hearing foreigners (Johnson and Newport 1989), these results provide important evidence of a critical, or sensitive, period for [LANGUAGE ACQUISITION](#).

All of these findings on ASL suggest that the cognitive abilities supporting language and its acquisition in humans are not restricted or specialized to speech but rather permit the development of signed as well as spoken languages. One might ask, then, whether there are any effects of modality on language structure or acquisition. The answer to this question from the study of this one sign language appears to be no, but a more definitive answer awaits the results of research on a large number of unrelated sign languages. With further research we will be able to determine whether the universal similarities among spoken languages of the world, and also the range of differences and variation among them, are also characteristic of the signed languages of the world (Supalla 1997; Newport 1996).

### See also

- [EVOLUTION OF LANGUAGE](#)
- [LANGUAGE AND COMMUNICATION](#)
- [LANGUAGE VARIATION AND CHANGE](#)
- [MODULARITY AND LANGUAGE](#)
- [SIGN LANGUAGE AND THE BRAIN](#)

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### References

Coppola, M., A. Senghas, E. L. Newport, and T. Supalla. (1997). Evidence for verb agreement in the gesture systems of older Nicaraguan home signers. Boston University Conference on Language Development, Boston, MA.

Curtiss, S. (1977). *Genie: A Psycholinguistic Study of a Modern-Day "Wild Child"*. New York: Academic Press.

Emmorey, K. (1991). Repetition priming with aspect and agreement morphology in American Sign Language. *Journal of Psycholinguistic Research* 20:365-388.

Goldin-Meadow, S., and C. Mylander. (1984). Gestural communication in deaf children: The effects and non-effects of parental input on early language development. *Monographs of the Society for Research in Child Development* 49 (3, Serial No. 207).

Jensema, C. (1975). *The Relationship Between Academic Achievement and the Demographic Characteristics of Hearing-Impaired Children And Youth*. Washington, DC: Gallaudet College, Office of Demographic Studies.

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

Johnson, R. E. (1978). A comparison of the phonological structures of two northwest sawmill sign languages. *Communication and Cognition* 11:105-132.

Kendon, A. (1988). *Sign Languages of Aboriginal Australia: Cultural, Semiotic and Communicative Perspectives*. Cambridge: Cambridge University Press.

Klima, E., and U. Bellugi. (1979). *The Signs of Language*. Cambridge, MA: Harvard University Press.

Lenneberg, E. H. (1967). *Biological Foundations of Language*. New York: Wiley.

Mayberry, R., and S. D. Fischer. (1989). Looking through phonological shape to lexical meaning: The bottleneck of non-native sign language processing. *Memory and Cognition* 17:740-754.

Meadow, K. (1966). *The Effects of Early Manual Communication and Family Climate on the Deaf Child's Early Development*. Ph.D. diss., University of California, Berkeley.

Meier, R. P., and E. L. Newport. (1990). Out of the hands of babes: On a possible sign advantage in language acquisition. *Language* 66:1-23.

Neville, H. (1995). Developmental specificity in neurocognitive development in humans. In M. Gazzaniga, Ed., *The Cognitive Neurosciences*. Cambridge, MA: MIT Press, pp. 219-231.

Newport, E. L., and R. P. Meier. (1985). The acquisition of American Sign Language. In D. I. Slobin, Ed., *The Cross-Linguistic Study of Language Acquisition*. Hillsdale, NJ: Erlbaum.

Newport, E. L. (1990). Maturational constraints on language learning. *Cognitive Science* 14:11-28.

Newport, E. L. (1996). Sign language research in the Third Millennium. Plenary address presented at the Fifth International Conference on Theoretical Issues in Sign Language Research, Montreal, Quebec.

Petitto, L., and P. Marentette. (1991). Babbling in the manual mode: Evidence for the ontogeny of language. *Science* 251:1493-1496.

Poizner, H., E. S. Klima, and U. Bellugi. (1987). *What the Hands Reveal about the Brain*. Cambridge, MA: MIT Press.

Quigley, S., and P. Paul. (1986). A perspective on academic achievement. In D. Luterman, Ed., *Deafness in Perspective*. San Diego, CA: College-Hill Press, pp. 55-86.

Siple, P., and S. D. Fischer, Eds. (1990). *Theoretical Issues in Sign Language Research*. Chicago: University of Chicago Press.

Stokoe, W. C., D. C. Casterline, and C. G. Cronbach. (1965). *A Dictionary of American Sign Language on Linguistic Principles*. Washington, DC: Gallaudet College Press.

Supalla, S. (1986). Manually Coded English: The modality question in signed language development. Master's thesis, University of Illinois.

Supalla, S. (1990). Manually Coded English: The modality question in signed language development. In P. Siple and S. D. Fischer, Eds., *Theoretical Issues in Sign Language Research*, vol. 2. Chicago: University of Chicago Press.

Supalla, T. (1997). An implicational hierarchy for verb agreement in American Sign Language. Unpublished manuscript, University of Rochester.