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Sign Language

Carol Padden[1]

[1]Department of CommunicationUniversity of California, San Diego

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Sign language refers to a language form expressed in a different modality, using the hands, face, and body, in contrast to spoken language, which principally uses the vocal tract. Natural sign languages are found in communities around the world, ranging from very large Deaf community sign languages with as many as a million or more primary users to very small family or village sign languages with a few Deaf people. Sometimes referred to as "Deaf sign languages" to describe their genesis in a community with Deaf members, the term overlooks the fact that hearing people who live alongside Deaf signers also acquire the language and use it with them. They play a sizeable role in sign language persistence across generations of signers, with documentation of sign languages dating back over hundreds of years. Although rare, there exist communities of hearing people using sign language with each other, such as among Indigenous populations in Central Australia. Called *auxiliary sign languages*, they do not supplant spoken language but are used when silence is mandated as a form of cultural practice where there are taboos against speaking because of kinship or religious vows.

History

Early scientific work on sign languages dating from the 1960s mostly focused on large national sign languages such as American Sign Language (ASL), British Sign Language (BSL), Swedish Sign Language, or Japanese Sign Language. Sign language grammars that were written during this period bypassed iconic descriptions of sign language features in favor of using systematic, interchangeable, and compositional elements, to emphasize the linguistic patterning of sign languages. The groundbreaking *A Dictionary of the American Sign Language (DASL)* (Stokoe et al., 1965) is widely viewed as the first effort to compile a large sign language lexicon using sublexical features referring to handshape, location, orientation, and movement. The *DASL* also provided short descriptions of morphology and syntax, but with little detail. By the 1980s, there were many more analyses of grammars of different sign languages. Much of this work described large Deaf community sign languages of Europe, the Americas, and parts of Asia. This work sought to demonstrate that a number of underlying linguistic properties of sign languages can be identified, pointing to cross-modality similarities in sublexical structure, morphological complexity, and syntactic patterning.

There were a few reports during this time of small and isolated sign languages in non-Western areas of the world. Anthropologists studying small populations on an island in the Caribbean and in central Australia (Kendon, 1980; Washabaugh, 1979) noted that the presence of one or several Deaf people in a community led hearing people to use sign language as well. In these communities, Deaf and hearing signers acquire sign language as part of the everyday interaction in the community, unlike in large national sign languages where learning sign language is more typically from peers, and not family members, at schools with other Deaf children and in the community outside the schools. Smaller sign languages are more fragile and vulnerable to extinction, which may happen when younger Deaf members of a community migrate to larger urban areas where they learn a national sign language. As with extinction of small

spoken languages, signers' motivation to learn a national sign language is often a desire for more educational and economic opportunities (Zeshan & de Vos, 2012).

In countries where Deaf schools have existed since the 18th and 19th centuries, the sign languages first used there have been passed down to as many as 7–10 generations of signers living in communities extending beyond the schools. In many Western countries today, Deaf children no longer attend special Deaf schools and instead are mainstreamed in public education, but the national sign language is still widely used among each new generation of Deaf signers. Mitchell et al., 2023 has placed the number of ASL signers at around one million primary users. It is likely that there are other national sign languages with as many or more signers, such as Indian Sign Language. Large sign languages are made up of multiple varieties where variations in the lexicon and grammar are due to geography, race, ethnicity, and religion. Black ASL encompasses several varieties tied to segregated Black Deaf schools in southern United States that were established beginning in 1869 (McCaskill et al., 2011). Sign language variation is not solely exemplified by varying lexicons but also by prosody and distinctive articulation of individual signs, which can mark identity [see Linguistic Variation].

Core concepts

Gesture shares the same visual-manual modality with sign languages, but it is often differentiated from sign languages as communicative behavior that co-occurs with the spoken message [see Gesture]. Individual gestures such as *emblems* used in the ambient spoken language ("thumbs-up"; "okay" gestures) are sometimes conventionalized as morphemes. Once they enter the lexicon, they show properties more in common with other signs than with gestures. For example, in BSL, the "thumbs-up" gesture is incorporated in signs that refer to positive meanings such as "good," "great," and "best." Communicating by gesture is largely parasitic on speech or expressed holophrastically, for example, in the popular two-handed "heart" gesture found in social media images or the fingers held together in the "wait" gesture common to the Middle East and north Africa. In contrast, sign languages are fully formed independent complex linguistic systems. Studies of emerging and new sign languages show how the more gestural characteristics of very early signing in the community are transformed into highly patterned and complex forms seen by the second and third generations of signers (Goldin-Meadow & Brentari, 2017).

Sign languages are grouped broadly in two ways. One is *macro sign languages*, which are usually tied to national Deaf communities and Deaf schools as their major supporting institutions. They also tend to be found in urban areas and are used by signers within and across national boundaries. Alternatively, there are *micro sign languages*, which are smaller in numbers of users and are typically found in areas where signer mobility is limited because of geography, ethnicity, or religion, with the result that signers learn the language among family and community members and not at school where they may be exposed to a larger and more widely used sign language (Schembri et al., 2018).

Unlike spoken languages, sign languages can appear de novo in natural settings when Deaf people are born into a community because of illness or a shared genetic history. An example is Al-Sayyid Bedouin

Sign Language (ABSL), which emerged as an additional language in a community of Bedouins in southern Israel when four Deaf sons were born in a family around the 1930s (Meir et al., 2012). There are now four generations of ABSL signers, which include about 100 or more Deaf signers in a community of about 6,000. ABSL is actively used among hearing as well as Deaf people in the village, alongside spoken Arabic and Hebrew. A new sign language may exist only in a few generations and then disappear, while others will persist for many more generations. Generally, sign languages have shorter histories than spoken languages because of the low frequency of deafness combined with population shift and migration out of a community, which can lead to sign language extinction (Kusters, 2020). Studies in the genetics of deafness and epidemiology of hearing loss suggest that the numbers of Deaf people in a particular area of the world rise and fall many times through history, resulting in a repeated pattern of sign language emergence and extinction (Nyst, 2016). The smallest setting for sign language emergence is *home sign,* where a family and community interact with a single Deaf individual (Rissman et al., 2023). Predictably, home sign is the most fragile of all sign language, is often supplanted by an existing sign language when a home signer meets other signers, and typically disappears after a single generation.

Sign language typology compares sublexical, morphological, syntactic, and semantic characteristics of naturally occurring sign languages. Current studies of typology examine how community characteristics such as numbers of signers can influence language form and structure. These studies have shown a wide variation of grammatical forms across sign languages. Some properties of sign languages that have been claimed to be due to the affordances of the visual modality have recently been disputed because they are not found in some micro sign languages, for example spatial mapping, classifiers, and verb directionality (de Vos & Pfau, 2015). Differences across sign languages can also be influenced by the ambient spoken language. Some sign languages use intermediary systems such as fingerspelling and mouthing to borrow spoken language elements into the lexicon and syntax (Brentari & Padden, 2001). Fingerspelling is typically a feature of sign languages that are closely tied to schools or education for Deaf children and are rare or nonexistent in micro sign languages where schooling is absent.

Questions, controversies, and new developments

Iconicity is an enduring topic of debate in sign language research due to the affordances of the visual modality. The key to understanding its role lies in capturing its relationship to the grammar (Perniss et al., 2010). Early sign language grammars sought to minimize iconic features in favor of showing that sign languages have compositionality and conventionality, as do spoken languages. More recently, studies of iconicity have returned to sign language and spoken language description with emphasis on understanding its role in the expression of meaning within and across modalities (Dingemanse et al., 2015).

Many widely recognized grammatical features of sign languages, such as verb agreement, directionality, pronominalization, word order, and morphological processes, have properties in common with spoken languages. But there is significant debate about whether spoken language grammatical features are

adequate for describing sign language forms. Verb agreement in sign languages is not as uniform as is often the case in spoken languages. In ASL, verbs referring to states of mind or emotion tend not to exhibit verb agreement while verbs of transfer, with agents, objects, and recipients, are more likely to show directionality in movement. The dominant and visible role of the body in sign languages may temper the ways that grammars are organized in those languages (Meir et al, 2007).

Unlike spoken languages, sign languages tend to be "younger" languages, with almost no documented descriptions of signs and signers extending back more than a few hundred years, although there is genetic evidence that mutations causing deafness extend to thousands of years in the past (Winata et al., 1995). It is difficult to find evidence of a specific sign language existing for more than hundreds of years beyond what is available in written archives. For this reason, some researchers believe that grammatical features of sign languages are influenced by their relatively younger age and the number of generational cycles. Others disagree and argue that the affordances of the visual modality has a greater influence on sign language form.

Broader connections

Understanding the role of modality in language form and function has been elucidated by studies of the neurobiology of sign languages. This includes imaging studies that identify which neural regions involved in the production and comprehension of signs by Deaf signers compared with spoken words in hearing speakers. This work shows that production of language in either modality involves parallel processes and that the left hemisphere is involved in sign production as it is in spoken language (Emmorey, 2021). This work has since expanded to include signers of different sign languages and different groups of signers, including bilingual and bimodal hearing signers who grow up using a sign language and a spoken language (Lillo-Martin et al., 2016) and Deaf individuals who learn sign language not at birth or soon after but later in childhood (Mayberry et al., 2007).

Silent gesture has emerged as a valuable tool in studies of language emergence and evolution. Studies with hearing non-signers who use gesture without speaking or respond to video of silent gestures in others have revealed underlying cognitive biases relating to lexical patterning, word order and semantic organization (Schouwstra et al., 2022). Combining studies of spoken and sign languages with how gesture is used by speakers and signers may provide tools to address enduring questions about the role of modality in human language, including the origins of gesture, sign languages, and spoken languages in deep human history.

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