Watching language grow

Susan Goldin-Meadow

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Notes:

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Susan Goldin-Meadow*

Department of Psychology, University of Chicago, 5730 South Woodlawn Avenue, Chicago, IL 60637

Because sign languages are processed by eye and hand rather than by ear and mouth, we might expect them to be structured differently from spoken languages. However, they are not. Sign languages are characterized by the same hierarchy of linguistic structures [syntax (1), morphology (2), and phonology (3)], and thus draw on the same human abilities as spoken languages. Moreover, children exposed to sign language from birth acquire that language as naturally as hearing children acquire the spoken language to which they are exposed, achieving major milestones at approximately the same ages (4, 5).

However, the manual modality makes sign languages unique in at least one respect. It is relatively easy to use the manual modality to invent representational forms that can be immediately understood by naïve observers (e.g., indexical pointing gestures or iconic miming gestures). As a result, communication systems can be invented on the spot in the manual modality, which means that sign systems have the potential to provide a window onto the process of language creation. Indeed, deaf individuals have often found themselves in situations where they needed to create a language *de novo*.

One such situation is described by Sandler *et al.* in this issue of PNAS (6). A community, now in its seventh generation and containing 3,500 members, was founded 200 years ago in Israel by the Al-Sayyid Bedouins. Within the last three generations, 150 deaf individuals were born into this community, all descended from two of the founders' five sons. Al-Sayyid Bedouin Sign Language (ABSL) was thus born. The language now has three generations of signers and therefore offers the opportunity to not only glimpse a language in its infant stages but also watch it grow.

ABSL is not yet a mature language and thus is still undergoing change. As a result, signers from each of the three generations are likely to differ, and to differ systematically (7), in the system of signs they use. By observing signers from each generation, we can therefore make good guesses as to when a particular linguistic property first entered the language. Moreover, because the individual families in the community are tightly knit, with strong bonds within families but not across them, we can chart changes in the language in relation to the social network of the community. We can determine when properties remained within a single family and when they did not, and thus follow the trajectory that particular linguistic properties took as they spread (or failed to spread) throughout the community. This small and self-contained community consequently offers a unique perspective on some classic questions in historical linguistics (8, 9).

ABSL differs from young spoken languages [for example, Pidgin or Creole, languages that crop up when existing languages come into contact with one another (10)] in that ABSL has arisen *de novo* with no influence from any established language, either signed or spoken. Moreover, ABSL differs from other young sign languages [for example, the sign language that currently is emerging in cohorts of Nicaraguan deaf children brought together for the first time in schools (11)] in that it is developing in a socially stable community with children learning the system from their parents.

ABSL holds a unique position between two types of sign systems: (*i*) homesign, a sign system developed by a deaf child whose hearing losses prevent that child from acquiring spoken language and whose hearing parents have not exposed the child to a conventional sign language, that is, an individual sign system not shared even with the hearing family members within that home (12); and (*ii*) fully formed sign languages, systems used by a community of signers and transmitted from one generation to the next. Homesign tells us where ABSL may have started; fully formed sign languages tell us where it is going.

Sandler *et al.* (6) demonstrate that highly regular word order has evolved to mark grammatical relations in ABSL

Table 1. The resilient properties of language

The resilient property	As instantiated in homesign
Words	
Stability	Sign forms are stable and do not change capriciously with changing situations.
Paradigms	Signs consist of smaller parts that can be recombined to produce new signs with different meanings.
Categories	The parts of signs are composed of a limited set of forms, each associated with a particular meaning.
Arbitrariness	Pairings between sign forms and meanings can have arbitrary aspects, albeit within an iconic framework.
Grammatical functions	Signs are differentiated by the noun, verb, and adjective grammatical functions they serve.
Sentences	
Underlying frames	Predicate frames underlie sign sentences.
Deletion	Consistent production and deletion of signs within a sentence mark particular thematic roles.
Word order	Consistent orderings of signs within a sentence mark particular thematic roles.
Inflections	Consistent inflections on signs mark particular thematic roles.
Recursion	Complex sign sentences are created by recursion.
Redundancy reduction	Redundancy is systemactically reduced in the surface of complex sign sentences.
Language use	
Here-and-now talk	Signing is used to make requests, comments, and queries about the present.
Displaced talk	Signing is used to communicate about the past, future, and hypothetical.
Narrative	Signing is used to tell stories about self and others.
Self-talk	Signing is used to communicate with oneself.
Meta-language	Signing is used to refer to one's own and others' signs.

within a single generation; the particular order that the language displays is Subject Object Verb (SOV). Homesigners also turn out to use stable word order to mark grammatical relations, and to do so even though no one signs that word order to them. Despite the fact that each homesigner is developing his or her system alone, all of these systems [even those developed in different cultures (13)] tend to display the same Object Verb (OV) sign order—parallel to the SOV order found in ABSL (homesigners tend to omit signs for S, the Subject). Indeed, even when hearing speakers who know no sign language are asked to use their hands and not their mouths to communicate, the same OV order arises despite the fact that their natural spoken language uses the SVO order (14). Thus, communication systems that are developed without input from conventional language appear prone to exhibit OV order, at least in their early stages.

As Sandler *et al.* (6) note, the SOV order found in ABSL is common in established conventional languages. However, many languages around the globe do not use this order; English among them (canonical word order in English is SVO). What are the pressures that might push a language away from the SOV order that language creators seem to initially invent? ABSL may help us

find out. The youngest ABSL signer observed by Sandler *et al.* (figure 2 in ref. 6) was the only one to produce as many sentences with V in nonfinal position (e.g., VO) as in final position (e.g., OV). Change is often introduced into a language by its youngest users (7). It is

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therefore possible that word order in ABSL is on the verge of change. If so, we can ask whether other parts of the language will change in concert with word order. Moreover, we can explore the particular social pressures that signers who adopt the new orders are experiencing and thus generate hypotheses as to why word order in a linguistic system might undergo change.

As mentioned earlier, homesign provides hints as to what ABSL may have looked like when it began. The data suggest that consistent word order was one of the very first properties to be incorporated into ABSL. However, homesign systems do not display all of

the properties found in fully formed sign languages—they display properties of language that are resilient (see Table 1) but not those that are fragile (12), for example, techniques for marking tense. Such fragile properties do not seem to be within the province of an individual child developing a communication system without the support of partners sharing the system. However, by observing if and when each of the fragile properties of language does or does not enter ABSL, we can begin to identify the conditions that support the introduction of a particular property into a linguistic system.

The resilient properties of language listed in Table 1 provide hypotheses as to which linguistic properties are likely to be found in ABSL. However, it is the fragile properties of language that can tell us most about how and why language changes. Continued study of ABSL as it adopts the properties not found in homesign will offer insight into the role that two factors—sharing a sign system across a community of users and passing a sign system down from generation to generation—play in the formation of grammatical structures. The discovery of stable word order in ABSL is just the first step in an exciting research program that can tell us much about the nutrients needed to help language grow.

1. Liddell, S. (1980) *American Sign Language Syntax* (Mouton, The Hague, The Netherlands).
2. Klima, E. & Bellugi, U. (1979) *The Sign of Language* (Harvard Univ. Press, Cambridge, MA).
3. Brentari, D. (1998) *A Prosodic Model of Sign Language Phonology* (MIT Press, Cambridge, MA).
4. Newport, E.L. & Meier, R.P. (1985) in *The Cross-Linguistic Study of Language Acquisition: The Data*, ed. Slobin, D.I. (Erlbaum, Mahwah, NJ), Vol. 1, pp. 881–938.
5. Lillo-Martin, D. (1999) in *The Handbook of Child Language Acquisition*, eds. Ritchie, W. C. & Bhatia, T. K. (Academic, New York), pp. 531–567.
6. Sandler, W., Meir, I., Padden, C. & Aronoff, M. (2005) *Proc. Natl. Acad. Sci. USA* **102,** 2661–2665.
7. Senghas, A. (2003) *Cognit. Dev.* **18,** 511–531.
8. Labov, W. (1994) *Principles of Linguistic Change: Internal Factors* (Blackwell, Oxford), Vol. 1.
9. Labov, W. (2001) *Principles of Linguistic Change: Social Factors* (Blackwell, Oxford), Vol. 2.
10. Mufwene, S. (2001) *The Ecology of Language Evolution* (Cambridge Univ. Press, New York).
11. Senghas, A. & Coppolo, M. (2001) *Psychol. Sci.* **12,** 323–328.
12. Goldin-Meadow, S. (2003) *The Resilience of Language* (Psychology Press, New York).
13. Goldin-Meadow, S. & Mylander, C. (1998) *Nature* **391,** 279–281.
14. Goldin-Meadow, S., Yalabik, E. & Gershkoff-Stowe, L. (2000) in *Proceedings of the 24th Annual Boston University Conference on Language Development* (Cascadilla Press, Somerville, MA), Vol. 1, pp. 343–353.