Figure 7.4 *Modification of a verb's motion to incorporate subject and object pronouns (Illustration, copyright © Ursula Bellugi, The Salk Institute for Biological Studies, La Jolla, CA 92037, USA)*

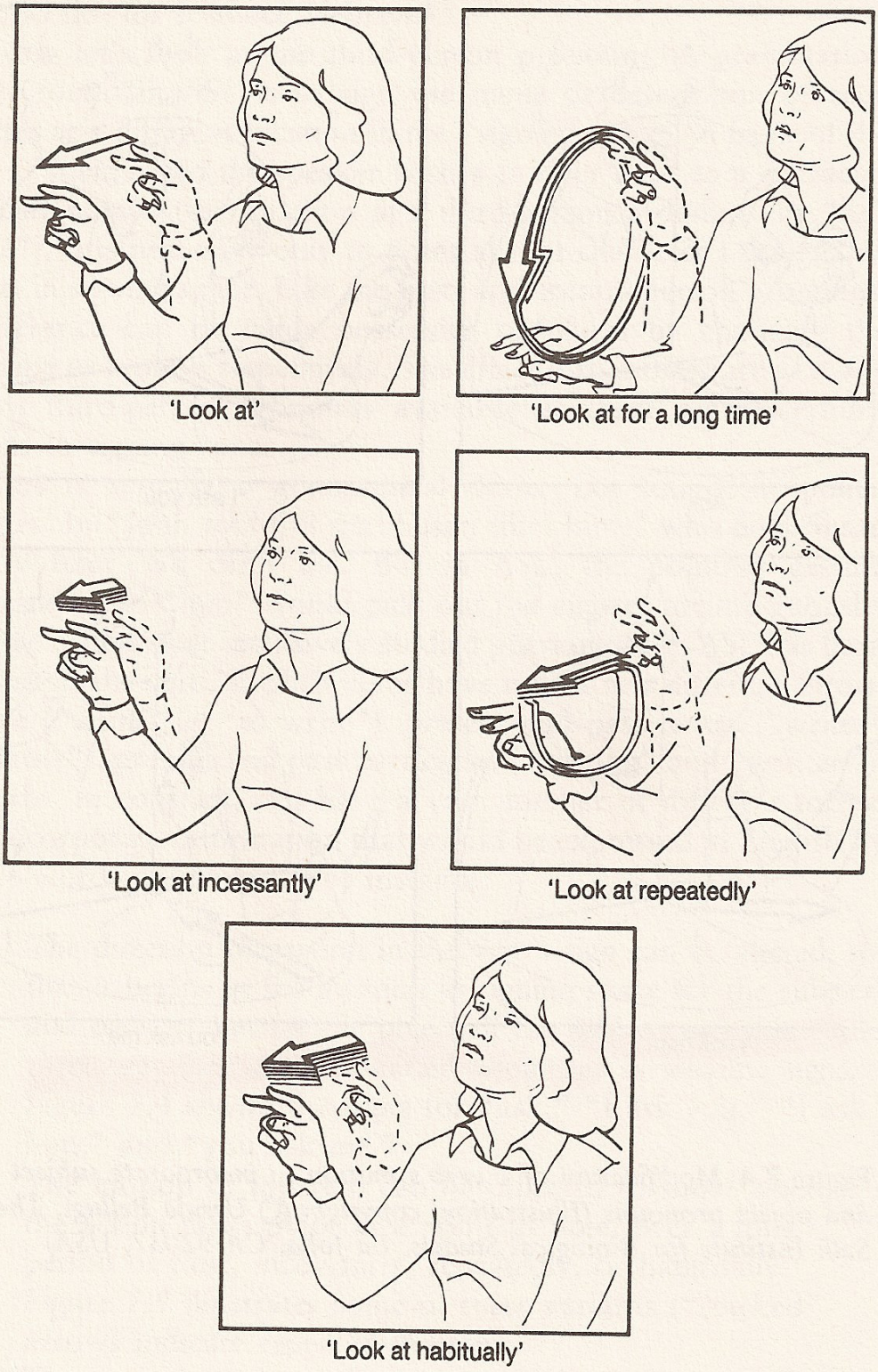
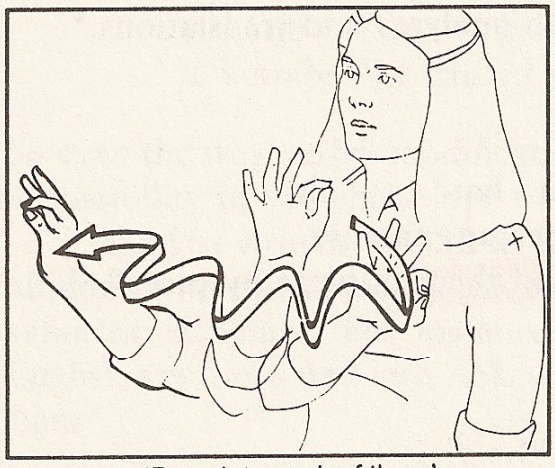
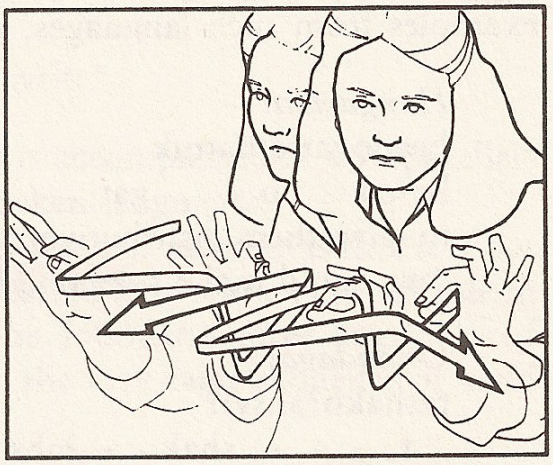


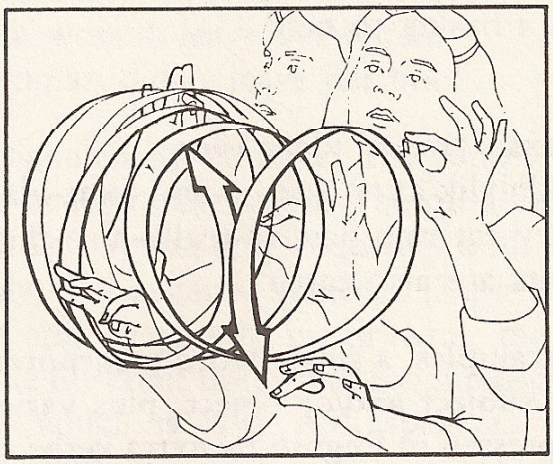
Figure 7.5 *Modification of a verb's motion to express duration and repetition of action (Illustration, copyright © Ursula Bellugi, The Salk Institute for Biological Studies, La Jolla, CA 92037, USA)*



'Preach to each of them'



'Preach to selected ones at different times'



'Preach to any and all at different times'

Figure 7.6 *Modification of a verb's motion to express distribution of action among a group of individuals over time (Illustration, copyright © Ursula Bellugi, The Salk Institute for Biological Studies, La Jolla, CA 92037, USA)*

This strategy of incorporating all sorts of modifying information into the verb looks altogether exotic from the point of view of English and most other European languages. But it is by all means an option in the menu of Universal Grammar: there are many so-called *agglutinative* languages with similar possibilities. Here are some examples from such languages, with analyses and translations.*

Hungarian:
beadogattathattuk
be-ad - o - gat - tat - hat- t - uk
in-give-them-distributive-cause-can- past-we
"we could make someone hand them in piece by piece"

Onandaga:
tashako?ahsv:?
t - a - shako - ʔahs - v: - ʔ
cause-past-he to her-basket-give-past
"he handed a basket to her"

K^{w}ak^{w}'ala:
ai k'əlxlk' axsuʔəmx̣at' ida q'isina
a -i k'əlxlik'ax - suʔ - əm - x̣at-ida q'isina
auxiliary-they eat raw-passive-really-also-the currant
"raw currants are also eaten"

In each of these examples, a single word incorporates the verb of the sentence plus the subject and/or object, plus various other markers that would be expressed in English by extra verbs, auxiliary verbs, or adverbs. Such combinations are comparable to those of ASL in both complexity and content.

In these languages, all the extra information appears as prefixes and suffixes on the verb. In ASL, though, it is *inside* the verb, changing the motion of the hands. But in fact there are spoken languages that use a parallel to this strategy too. The most notable examples are Semitic languages such as Arabic and Hebrew, in which different forms of the verb preserve the order of the consonants but change the vowels and the length of the consonants. Here is a small

* The Hungarian example is courtesy of Piroska Csuri. The example from Onandaga, a language spoken in the vicinity of the Great Lakes, appears in Mark Baker, *Incorporation*, University of Chicago Press, 1988, p. 76, citing H. Woodbury, *Noun Incorporation in Onandaga*, a Yale Ph.D. dissertation of 1975. The example from K^{w}ak^{w}'ala, a language of British Columbia, is cited in Stephen Anderson, *A-Morphous Morphology*, Cambridge University Press, 1992, p. 92.

sample of the vast number of forms for the Arabic verb "to write," whose basic consonants are *k-t-b*.

(1) *a* kataba "he wrote"
b kaataba "he corresponded"
c kutib "was written"
d kattaba "he caused to write"

So even the way verbal modification is accomplished in ASL parallels a possibility in the phonology of spoken languages.

The last wrinkle in ASL which I want to mention is that it is not all done with the hands. Facial expression also plays a crucial role in syntactic structure. For instance, the following three sentences of English are translated into ASL with the very same sequence of hand signs:

(2) *a* The woman left her book.
b Did the woman leave her book?
c The woman didn't leave her book.

The difference is signaled by the face. The simple statement (2a) is accompanied by a neutral expression. The question (2b) is signaled by a brow raise, widened eyes, and frequently a tilting forward of the head or whole body. The negative sentence (2c) is signaled by a side-to-side headshake and frequently by drawing the brows together. These gestures make different use of the facial muscles from ordinary facial expressions, which is why ASL speakers may seem to be grimacing as they speak.

Like the features of the pronoun system, ASL facial gestures function combinatorially. For instance, to ask a negative question ("Didn't the woman leave her book?"), a speaker uses both gestures at once: drawing the brows together and raising them, widening the eyes, and tilting the head forward while shaking it from side to side.

Lest it should seem strange that questions and negations can be formed without changing word order, let me remind you that English can signal questions by intonation alone: "The woman left her book?" Here, just as in ASL, the questioning is carried on a separate channel from the words, conveyed simultaneously. Simple negation can't be expressed in English by intonation, but sarcastic disbelief can: "Oh, yeah, sure—you really won the lottery (. . . and I'm the Queen of England)." So even these devices of ASL have spoken analogues (though probably without the rich combinatorial possibilities).

The Fundamental Arguments again

Even with this tiny amount of information about the language, it's not hard to restate the Fundamental Arguments in terms of ASL. The Argument for Mental Grammar: What do ASL speakers know that enables them to speak and understand an indefinitely large number of sentences? They can't just be memorizing signs, since even a single verb can occur in an unbelievable number of variants (of which we have seen only a few here). Rather, speakers must have in their heads a mental grammar—a basic vocabulary of signs, plus a set of patterns for combining signs sequentially and simultaneously. The difference in modality serves to make the complexity of the patterns all the more vivid: once we see that ASL goes beyond pantomime, the skill displayed by its speakers is harder to take for granted than mastery of a spoken language, if only because the complexity can literally be seen.

The Argument for Innate Knowledge: How, then, do ASL speakers acquire these patterns? The facts of ASL learning militate against its being taught. Recall (1) that most ASL speakers have hearing parents who, prior to their child's education, were not even aware of the existence of the language; (2) that ASL has been primarily spread through the residential schools for the deaf; and (3) that until very recently the use of ASL in these schools has been officially discouraged and even punished. Consequently, people have had to learn the language not by instruction, but by "picking it up" from fellow students. This is essentially parallel to the situation of immigrant children, except it involves learning a *first* rather than a second language: typically, there is no language a deaf child can use with hearing parents.*

Yet, as with spoken language, linguists are working overtime to discover the organization of ASL patterns, to find the units out of which ASL is built. The fact that it took until 1960 to begin to see these units is in itself striking. (Of course, for a long period, analysis was hampered by the prevailing ideology that ASL *had* no patterns. But the fact that such an ideology was believable also helps make my point.) So we are faced with the Paradox of Language Acquisition

* There is undoubtedly *communication* between deaf children and their parents through pantomime, body language, and the like. But, as stressed in Chapter 2, such communication does not constitute a *language*, in that it lacks the expressive variety and grammatical structure of spoken languages—and of ASL. See Chapter 10 for a discussion of how elaborate such communication can be.

again: children acquire an unconscious mental grammar of ASL, but linguists can't yet figure it out.

We conclude, as before, that children come equipped with unconscious hypotheses about what the mental grammar should be like. These hypotheses can't be specific to ASL, for deaf children learn whatever sign language they happen to come in contact with. So there has to be some sort of Universal Grammar for sign languages, just as for spoken languages.

But wait: remember that Universal Grammar itself isn't learned—it has to be transmitted genetically, and the genetic information has to be a product of evolution. It would seem bizarre for evolution to have provided us with a Universal Grammar for sign languages, to be drawn on just in case we happen to be deaf! Fortunately, as we have seen, there is a better answer: in almost all respects, the UG for sign languages is exactly the same as UG for spoken languages. Deaf children exposed to ASL don't have to draw on an entirely different body of innate knowledge. They expect the same organization in sign that they would have expected in spoken language, could they hear it. The very same special-purpose machinery kicks in. Children come prepared to learn *language*, in whatever modality.

The main adaptation of sign languages is replacing the distinctive features of vocal articulation by distinctive features of manual and facial articulation. An interesting by-product of this adaptation is a much greater use of simultaneity rather than sequencing, as we saw in the grammatical phenomena discussed in the previous section. Yet our comparison with spoken languages shows that ASL only takes the possibilities for simultaneity in the UG of spoken languages and extends them to a greater degree. This exploitation of simultaneity is possible because the hands and face have more independent degrees of freedom than the vocal tract—they can do more different things at once. But the abstract principles that organize these degrees of freedom are drawn from the same menu.

Returning to the main theme of this book: What does ASL tell us about language and about human nature? In previous chapters, we came to think of language as a complex relation between thought and speech, with two codings enroute, phonological and syntactic structure. We now have to generalize that characterization to include sensorimotor modalities other than speech. Figure 7.7 (next page) incorporates this revision into our earlier diagram of the overall organization of language.

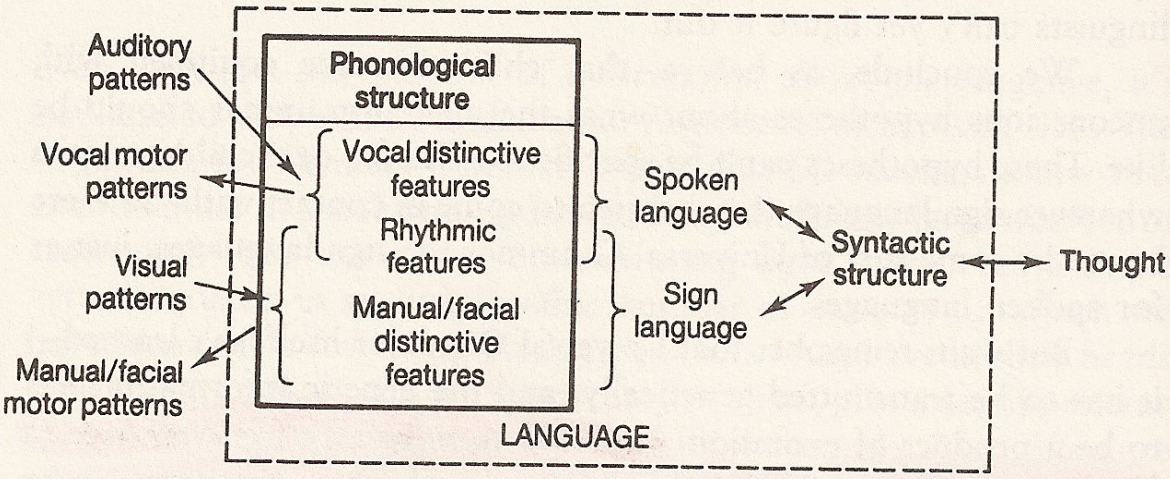


Figure 7.7 *Information flow in spoken and signed language*

Thus ASL serves to emphasize the *abstractness* of linguistic organization—its independence from sensorimotor modality. In using language, we're doing a lot more than simply associating sounds (or signs) with meanings. Most of the richness of language comes from *inside* the mind, from the way our mental grammars unconsciously create structure that gives meaning to sensory patterns. Moreover, much of the structure is now seen to be indifferent as to the modality of the sensory patterns. And it is learned on the basis of innate organization of the brain, built to tune itself to language-like patterns in the environment, whether auditory or visual.

As for human nature, we should continue to keep in mind the question: If the organization of language and language learning is this complex, rich, abstract, flexible, and unconscious, what about everything else we do? Stay tuned for Part IV. But first, we have some further business regarding language.