How Signs Express
Complex Meanings

by Ursula Bellugi

Introduction

In 1965, William Stokoe and his colleagues published *A Dictionary of American Sign Language on Linguistic Principles* (DASL). This book represents a landmark in the analysis of the special linguistic properties of signed languages that has not been superseded or surpassed in the fifteen years since its publication. Although the field of Sign Language research has blossomed since that time, the publication stands as the single outstanding contribution to the understanding of the structure of the signs of American Sign Language.

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The DASL was significant in two ways: (1) it is the first extensive listing of signs of ASL with explanations of their meanings and usage, and (2) it is the first and most complete linguistic analysis of the sign into its component parts.

The DASL is not organized alphabetically, as are all dictionaries of spoken languages, but according to the elements of signs that Stokoe first identified and described. Today, fifteen years after the publication of the DASL, the field of Sign Language research is in an exciting and agitated stage; there are new hypotheses about the structural properties of signs cropping up with impressive regularity; all are suggested hypotheses, partial analyses. Up to now, however, none has yet been worked out with the precision of this original work.

In his introduction, Stokoe spells out briefly the principles underlying the construction of the DASL. These principles were first described by Stokoe in 1960. As he points out, American Sign Language had never before been written. It could be written in the DASL for the first time, because of Stokoe’s analysis of the structural components of signs. As the preceding chapter of this volume shows, Stokoe specified three aspects of each sign that distinguish it from all other signs in the language: the place where it is made (location); the distinctive configuration of the hands in making it (handshape); and the action of the hands (movement). Entries in the DASL give several different types of information: the components of each sign; possible variations; the nature of the sign (e.g., pantomimic, imitative, metonymic, indicative, name sign, initialized sign); notes on how the sign is made; syntactic value; meaning; notes on usage and examples; and cross references.

It is important to remember that the DASL is a pioneering work, the work of one small group of investigators working over a period of a few years to collect the materials for a dictionary, for a language which had never before been written. These investigators were laying out the basic groundwork for a linguistic analysis at the same time as they were presenting the first detailed listing of the basic lexicon of a visual-gestural language. It is remarkable how well that work holds up and how solidly it stands even now, when there are many investigators all over the United States and in Europe studying the structure of ASL and other signed languages. Other dictionaries of foreign signed languages have been developed, built on the same principles Stokoe elucidated for ASL. In our research at the Salk Institute, we have consistently found that the seeds of all of our major findings are contained in ‘hints’ in its pages.

### Complex Signs

#### Comparing Dictionaries

Let us consider first, how the DASL compares with other dictionaries of spoken languages, and second, some of the ways in which we would now revise it if we had an army of scholars over a long period of time, comparable to those which have produced the major dictionaries of spoken languages like English. Of course, the most appropriate comparison would be with dictionaries of languages which have no commonly used written form. However, since I do not have information on these, I will contrast DASL with some general-purpose dictionaries of English.

A dictionary is a book that contains a selected list of words in a language. These words are arranged in alphabetical order, followed by an explanation of their meanings and other types of information. No dictionary records all the words of written language, and the number of entries of a dictionary depends on its purpose, the number of people and hours available to compile it, and the sources available. The earliest dictionaries were made by the ancient Greeks and Romans, but most were lists of rare and difficult words or specialized lists of words. More recently there have been general-purpose dictionaries which describe ordinary words, literary words used in formal writing, technical words, words that have dropped out of the language, words or phrases borrowed from other languages, idioms, abbreviations, and important place names. The words described in a dictionary are usually taken from written documents. The great dictionaries of English, such as the Oxford English Dictionary, have taken generations of scholars combining vast amounts of written documents to compile the list of words and the desired information about them. And they contain hundreds of thousands of items that are not part of current vocabulary, not part of speaking vocabulary, and not part of common knowledge.

Let us for a moment consider what items are given separate listings and how lexical items are listed in a general-purpose dictionary. Webster’s Third International Dictionary, for example, lists nouns and verbs separately, even when they have the same form. Thus, ‘act’ (the noun) and ‘act’ (the verb) have separate entries. However, there are no separate listings for the inflectional forms of that noun and verb. For example, there is no separate listing for the plural of the noun ‘acts’, for the possessive of the noun ‘act’s’, or for the third person singular present indicative of the verb, as in ‘he acts’. These
are presumably known by speakers of the language as regular inflectional forms which are predictable in meaning.

On the other hand, there are separate listings for a variety of derived forms of the item 'act': for example, 'acting' (the noun), 'action', 'active', 'actively', 'activist', 'activity', 'actor', and 'actress'. Furthermore, there is an entry for 'blue', but also entries for 'bluebell', 'blueberry', 'bluebird', 'bluebonnet', 'bluefish', 'blueprint', and more. These are all compound nouns formed from the word 'blue' in conjunction with other words of the language. Thus, there are separate entries for derived forms of a word in a general-purpose English dictionary. These forms illustrate ways in which the vocabulary of a language is enriched or expanded.

Most of the listings in the DASL are single lexical items of the language, although a small number of compounds are listed. Thus one might conclude, from counting the separate listings in DASL, that the vocabulary of ASL (and perhaps of other signed languages) is extremely limited, when compared with vocabularies of spoken languages. A dictionary of Israeli Sign Language by Cohen, Namir, and Schlesinger (1977) makes this point explicitly: "The vocabulary size of different sign languages has been variously estimated at anywhere between 1000 and 4000 signs—far less than in spoken languages" (emphasis added, p. 33).

From ten years of research in ASL, it is my experience that this view is far from accurate. American Sign Language has a vast vocabulary and is a fully expressive language. There are numerous grammatical devices—a rich variety of inflectional processes and a large number of derivational processes—all of which show that the vocabulary is far richer than many people have thought. There are mechanisms within the language which are used daily in conversation to expand the lexicon to encompass new concepts and ideas. For example, we have been studying the ways in which new concepts (such as 'microwave oven', 'laser beam', 'lunar module', 'satellite', 'genetic engineering', 'hang glider', 'Moped', and 'transsexual') are expressed linguistically in ASL. We have found a variety of grammatical devices in ASL which are used for this kind of lexical expansion.

But perhaps just as important, ASL researchers have only begun to describe the vast lexicon which deaf people regularly use. Consequently, many signs that should correctly be listed as separate lexical entries in dictionaries have been combined into single entries in the DASL, and many meaning distinctions which are regularly made by deaf signers are not listed.

Complex Signs

For example, the single sign glossed as LOOK can be varied in specific ways to mean "reminisce," "see-sighting," "watch," "look forward to," "prophesy," "look around aimlessly," "stare," "gaze at," and so forth. Many of these could be given separate listings in the dictionary that show that they are all derived from the basic root sign that means "look at."

Similarly, the sign glossed as WRONG can be varied by specific changes in movement to mean "error prone," "make many mistakes," "unexpectedly," "and then," "making mistakes all the time," and many more. The single sign CHURCH can be varied to mean "pious," "go to church regularly," "a row of churches," "narrow-minded," and many more, again by specific changes in movement. Furthermore there are a large number of compounds, such as TALK NAME meaning "mention," NAME SHINY meaning "fame," LOOK STRONG meaning "resemble," MONEY BEHIND meaning "money kept in reserve," THINK TOUCH meaning "keep thinking about," TIME SAME meaning "simultaneous," EAT NOON meaning "lunch," RED RECTANGULAR meaning "brick," and thousands more, all of which are candidates for separate dictionary entries.

The DASL does have a section on SEE and LOOK which lists some of the many related forms of that pair of verbs. For most other signs, however, as in all sign dictionaries and handbooks up to the present, the different forms of a root sign are under a single listing. We suspect that, in many cases, the derivational distinctions may have been overlooked.

Thus, it is clear that the vocabulary of ASL is far larger and more differentiated than had been thought; that there is no inherent limit on the vocabulary; and that there are a great variety of morphological processes within the language which are not derived from any spoken language. In fact, it is now apparent that ASL—like Navajo, Greek, and Russian, but unlike English and Chinese—is one of the "inflective" languages of the world.

Just as the primary pioneering contribution of Stokoe was to provide the first linguistic analysis of signs into their component elements, the major focus of the research of the Laboratory for Language and Cognitive Studies at the Salk Institute in the last several years has been on the morphological processes of ASL. That is, we have been studying how the form of a sign is changed to express different meanings. We have discovered that these changes (modulations) represent a rich system of morphological processes in ASL that use
space in a structured way and that compress a great deal of information into a single sign unit.

In the rest of this paper, we will discuss the lexicon (vocabulary) of ASL in greater detail: how individual root signs can systematically become parts of larger, more complex signs; how the lexicon can be expanded by systematic morphological processes, and how signs express complex meanings. In each case we are concerned with what we can learn in general about ASL as a language, and how the structure and the processes of this language compare with what we know about spoken languages. Much of this work is discussed in greater detail in The Signs of Language (Klima & Bellugi, 1979) and in two other articles (Bellugi & Klima, 1979; Bellugi & Newkirk, in press).

Signing vs. Speaking

ASL differs dramatically from English and other spoken languages in its mechanisms for modifying its lexical units (signs). The way in which the language developed appears to make a crucial difference to its morphological processes: the processes by which individual units of meaning (morphemes) combine to make words or signs that have complex meanings. In spoken languages, the most widespread morphological device for modification of meaning is probably affixation: the addition of sound segments at the beginning, within, or at the end of the word. Other devices include vowel and consonant changes, reduplication (repetition of part or all of a word, and changes in stress or tone.

In ASL there appears to be a strong resistance to sequential segmentation as an inflectional device and hence a resistance to the morphological device frequently used by English and a great many other spoken languages: affixation. ASL signs are made by moving the hands in space; the language uses dimensions of space and movement for its grammatical processes. Rather than adding parts to signs that are like spoken language affixes, most inflections or modifications in ASL involve spatial and temporal patterns which are overlaid on the movement of basic signs.

Inflectional Processes

The semantic (meaning) distinctions expressed in ASL are commonly expressed in many spoken languages as well (though often not in English). Inflectional processes in ASL express distinctions within the grammatical categories of referential indexing, reciprocity, number, distributional aspect, temporal aspect and focus, manner, and degree.

1. Referential Indexing

The structured use of space is seen in how verbs indicate the principal actors in a sentence—the way they indicate indexic references. ASL verb signs that can change in space move toward different spatial target points. Figure 1 shows indexic inflections on the signs ASK and INFORM, indicating “me to you,” “me to him,” “you to me.”

2. Reciprocity

ASL has a reciprocal inflection, which operates on verbs to indicate mutual relations or actions. This inflectional process expresses the grammatical notion of mutual action or mutual relation in a direct and visibly appropriate way. The verb sign is doubled: it is made with two hands rather than one in simultaneous movement, and the hands are either directed or oriented toward or away from each other. This inflection expresses the meaning “to do something to each other,” as illustrated in Figure 2 with the verb PREACH.

3. Grammatical Number

Verbs in ASL are inflected for several kinds of plural distinctions. Such distinctions as whether the object or subject of the verb is dual, trial, or multiple result in internal changes in the form of the verb. For example:

Dual inflection indicates an action with two recipients or agents, meaning “to both of them.” There is also a trial form, meaning “to three of them.”

Multiple inflection is the general form used when the object or subject of a verb numbers more than three.

4. Distributional Aspect

Several inflections focus not only on grammatical number, but also on differentiating the actions of the verb, to distinguish: (a) whether a specific act presents itself as an indivisible whole or as several separate actions, (b) whether the actions occur at distinct points in time, (c) whether the actions have a specific order of occurrence, and
(d) how the actions occur in relation to individuals participating in the action—an action for each one, or actions for certain ones, certain groups, or just anyone. These and other distinctions are made by inflections for the grammatical category of distributional aspect on ASL verbs. A few of the distributive inflections we have identified are as follows:

Exhaustive inflection: actions distributed to each individual in a group, when the actions are viewed as a single event (in a single time frame), meaning “to do (something) to each of them.”

Allocative Determinate inflection: actions distributed to specified individuals at distinct points in time, meaning “to do (something) to certain ones at different times.”

Allocative Indeterminate inflection: actions distributed to unspecified individuals over time, meaning “to do (something) to any at different times.”

See Figure 4 for an illustration of these three modulations for distributional aspect with the sign PREACH.

5. Temporal Aspect and Focus

Verb signs in ASL are also inflected for “temporal aspect” and “temporal focus.” That is, there is a wide array of inflectional forms
Figure 3. Inflections for number

which indicate meanings like “uninterruptedly,” “over time,” “regularly,” “for a long time,” “over and over again,” “from time to time,” “characteristically,” and so on.

For example, the sign LOOK-AT has a variety of inflections for temporal aspect and focus (see Figure 5). LOOK-AT has both a punctual (point in time) stem that has a short directional-path movement

Figure 4. Inflections for distributional aspect
(5a) and a durative (extended time) stem without directional-path movement (not shown).

A protractive form of the sign LOOK-AT is made with a long tense hold and without motion and translates roughly as “to stare at uninterruptedly” (5b)). A parallel form is made with short tense, repeated movement (5c); the meaning involves incessant acts, roughly, “to look at so frequently that it seems without interruption.”

Another inflected form has smooth, circular, repeated movement; it focuses on the verb’s durational characteristics, and the meaning is roughly “to gaze at over time” (5d). A parallel form has rapid non-tense repetitions; the meaning is habitual action: “to watch regularly” (5e).

The continuous inflected form is made with a tense fast movement continuing in a slow elongated return; the meaning is “to look at for a long time” (5f). A parallel form of the verb, the iterative inflection, is made with a tense fast movement ending in a stop, and then a slow elongated return. The meaning is “to look at again and again” (5g).

6. Manner and Degree

Verbs are also inflected to express distinctions of manner (meanings such as “with ease,” “readily,” “in a mental pre-occupation”) and to express distinctions of degree (“a little,” “very,” “sort of,” “excessively”).

The broader differences in meanings that distinguish different grammatical categories are related to general differences in form. The most salient physical characteristic of inflections for number and distributional aspect is spatial patterning: the signs move along lines, arcs, and circles in vertical and horizontal planes. By contrast, inflections for temporal aspect rely heavily on temporal patterning, so that the signs change their dynamic qualities, such as rate, tension, evenness, duration, and manner of movement. Various types of multiple articulations (reduplication) characterize some inflections for both groups.

Derivational Processes

In addition to inflectional processes that create large numbers of signs with complex meanings, ASL has a wide variety of devices that expand the vocabulary by regular systematic changes in lexical roots and result in the formation of relaxed lexical items: basic verbs can be

Figure 5. Inflections for Temporal aspect.
changed into nouns or adjectives; basic adjectives can become verbs or nouns, etc. Traditionally these are called "derivational processes," although, as in spoken languages, the distinctions between inflectional and derivational processes in ASL are not easy to draw.

1. Derivation of nouns from verbs

One very widespread process derives nouns from certain verbs. Supalla and Newport (1978) have described 100 activity verbs and their formationally related concrete nouns. They have shown that these noun-verb pairs differ systematically in the way they are made, in particular the frequency of their repetition and the manner of their final movement. Verbs may vary in quality of movement, number of repetitions, and manner of movement. Typically the related nouns are made with a restrained repeated movement which is abbreviated. Thus, where handbooks and dictionaries of signs indicate that one sign form is used for both "sit" and "chair," in fact the two signs have different movements. The sign SIT-DOWN is made with one movement before final contact; CHAIR has a smaller, repeated and restrained movement (see Figure 6a). The movement of CHAIR is typical of noun forms that are derivationally related to verbs: repeated smaller movements with restrained manner. But these verb-noun distinctions are not limited to activity verbs and their related concrete nouns. The sign COMPARE is a verb that has repeated movement. From the verb sign, a noun form COMPARE can be derived, which means "comparison" and is made with a smaller movement and restrained manner (see Figure 6b). The process of deriving nouns from verbs is widespread in the language and extends to new forms.

At the Salk Institute, as we discovered more and more derivational processes, we discussed derivations in ASL in our daily conversations but had no commonly used sign for this concept. A deaf researcher coined an appropriate sign for the concept "derivation": from the ASL verb DERIVE (related to the sign QUOTE), she created a noun meaning "derivation," made with the repeated movement and restrained manner: that is characteristic of derived nouns in ASL (see Figure 6c).

2. Derivation of predicates from nouns

Certain nouns can form predicates (which act like verbs or adjectives) by a derivational process which also changes the movement. In
the derived form, the movement of the sign is made once and is fast
and tense, with a restrained beginning. This process changes a noun
to a predicate that means “to act like __________,” or “to appear
like __________.” Thus the sign CHINA can be changed to form a
predicate meaning “to seem Chinese”; GIRL can be changed to form
a predicate meaning “effeminate”; BABY, a predicate “to act like a
baby(babyish)”; BUSINESS, a predicate meaning “business-like”; and
CHURCH, a predicate meaning “pious” (see Figure 7).

There is a derivational process that derives activity nouns from
certain verbs. This process adds the meaning “the general activity of”
to the verb, for example, changing WRITE to “the activity of
writing” (as in “authoring books”), MEASURE to “the activity of
measuring” (as in “engineering a building”) (see Figure 8), IMPROVE to “the activity of improving” (as in “improving a house”).

These activity nouns often serve as the names of professions.

3. Derivations for Extended Meanings

There are other morphological processes that seem to operate
when a sign adopts a figurative or extended meaning. There are pairs
of well-established signs that appear to be derivationally related (and
are judged so by the native signers), in which one sign of the pair is a
good candidate for metaphorical or figurative extension of the other
and differs from it minimally in quality of movement (tense, lax, or
accelerated): a form of “hormy” differing from HUNGRY; a sign
meaning “have a hunch” differing from FEEL; a sign meaning “ac-
quiesce” from QUIET. Even in the case of metaphorical extensions
that may have been based originally on extensions found in English
(the English word blue with its extended meaning “to feel blue” or
“sad” [see Figure 9]; chicken in its meaning “cowardly”), the sign
forms with the figurative meanings differ in quality of movement
from the signs BLUE (the color) and CHICKEN (the fowl).

Figure 7. The sign CHURCH and a derived form.

Figure 8. The sign MEASURE and a derived form.

Figure 9. The sign BLUE and an idiomatic derivative.
Though words of many spoken languages can be used figuratively without any change in phonological shape, it seems that in ASL, figurative extensions of meaning are usually accompanied by minimal changes in movement. There appears to be a strong tendency in this language for shifts in meaning to operate in concert with shifts in movement.

The derivational processes described in this section are productive ways of extending the lexicon of ASL. We have found many new signs coined in this way: a sign for “acquisition” from the verb sign LEARN; a sign for “drive-in” from the sign PARK-CAR, a sign for “iconicity” from the sign PICTURE; a sign for “grammatical aspect” from the sign PART; a sign for “speed-reading” from the sign meaning “to have one’s nose in a book”; a sign for “simulate” from the sign MAKE, and so forth.

In each of these instances, the derived sign differs from the basic form of the sign according to regular, derivational processes that involve specific changes in movement. In a similar manner, many other new concepts are expressed by changes in the movement of commonly known signs. These derivational processes, in which signs adopt new and extended meanings, are typical ways of enlarging the vocabulary of ASL.

Productivity Through Compounding

Compounding is a productive device that some (but not all) spoken languages use to create a new word from two or more existing words. The newly created compound word then functions like a single lexical item in the language. These compound words take on special meanings that are different from the meanings of the same two words used as a phrase. A compound would be entered as a separate lexical item in the dictionary of the language, but the same two words as a syntactic phrase are not listed in this way. Although there are several different types of compounds, the following discussion includes only a few examples of the simplest kinds of compounds.

One compound in ASL is formed with the signs GOOD and ENOUGH. As a phrase, GOOD ENOUGH means “adequate,” but as a compound, GOOD ENOUGH means “just barely adequate.” Notice the shift in meaning in the compound: it no longer means “well enough,” but now means “hardly at all,” or sometimes “with just a lick and a promise.”

1) (SHE) CLEAN HOUSE GOOD ENOUGH
   “She cleaned the house adequately.”
2) (SHE) CLEAN HOUSE GOOD ENOUGH
   “She cleaned the house just barely adequately.”

The phrase and compound in sentences (1) and (2) have a different rhythm (see Figure 10). When the phrase GOOD ENOUGH is compared with the compound GOOD ENOUGH, we see that the first sign in the compound is drastically reduced; that the transition between the parts is abbreviated; and that the compound as a whole takes far less time to make than the same two individual signs. It is

![Figures 10](image-url)
almost as if the compression of meaning into a single sign unit is accompanied by a compression of the sign as well.

As we have just shown, compounds in ASL are usually produced differently from phrases with the same signs. As in English compounds, there is typically an overall temporal compression. However, unlike similar English compounds, which have heavier stress on their first elements, there is invariably a reduction and weakening of the first element in a compound in ASL. Thus, ASL has its own structural rules for compounds. Figure 11 illustrates the difference between two signs as a phrase and then as a compound, showing the phrase BLUE SPOT and the compound BLUE SPOT, meaning “a bruise.”

We have recorded more than a thousand established, lexicalized compounds that are commonly used in ASL; for example, TIME SAME meaning “simultaneously,” MONEY BEHIND meaning “emergency money,” EAT NOON meaning “lunch,” TALK NAME meaning “to mention.” Furthermore, we find that compounding is a commonly used productive process for inventing new names; for example, PILL QUIET meaning “tranquilizer,” MEDICINE HELP “medicare,” HEREDITY CHANGE meaning “genetic engineering,” FALSE HEART meaning “heart transplant.”

Notice that these ASL compounds are not based on English compounds. In fact, ASL and English frequently have different compounds for the same concept. For example, the concept which in English is ‘zip code’ is expressed in ASL by the compound LETTER NUMBER; the concept expressed in English as ‘credit card’ may be expressed in ASL by SIGNATURE RECTANGULAR.

Conclusion

It is clear from this brief survey of ASL morphological devices that the vocabulary of ASL is far richer than people have claimed. It is expanded by a number of active processes that create new signs from existing signs. It is strikingly clear from these studies that the visual-gestural communication system of deaf people has been shaped into an independent language with its own grammatical rules. It is also strikingly clear that the human capacity for building complex linguistic systems is the same—whether we speak or sign.

Figure 11. The signs BLUE (a) and SPOT (b), and the compound BLUE SPOT (c) meaning ‘bruise.’
References


Sentences in American Sign Language

by Charlotte Baker

I first met Bill Stokoe in the summer of 1974, after my first year of graduate work in linguistics at the University of California at Berkeley. At that time I was preparing to do some research on the relationship between language and culture, and I was exploring the possibility of including Deaf people and their language as one of the four linguistic groups I would study. Part of the research involved the examination of eye movements—a subject that intrigued me and one that evoked a strongly responsive chord in Bill. Despite my near total ignorance of what I was getting into, Bill’s encouragement was warm, and he freely provided me with helpful information, advice and his time—as he has done for literally hundreds of people like me.

That interaction with Bill sparked my interest in Sign Language and by the summer of 1975, I was working with him in the Linguis-

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