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23

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## Sign Language Structures

This chapter provides an introduction to sign language structures. The main components of sign languages are described, and some of the issues facing sign language research today are addressed. Although much of the discussion is based on American Sign Language (ASL), other sign languages are also examined for comparison.

### Word Formation (Morphology)

As with most other natural languages, sign languages have a number of ways to make words out of other words or parts of words. Linguists make a distinction between *inflection*, grammatical affixes added to words for syntactic purposes, and *derivation*, lexical affixes that change the core meaning or word class. Another way to make new words is *compounding*, which takes two words and puts them together to make a new word whose meaning is often not the sum of its parts. An example of an English compound is "greenhouse," which is not a green house but rather a house in which green things are grown. It is common in compounds for not only the meaning to change but also the pronunciation; in "breakfast," the vowels in "break" and "fast" have been reduced.

### Inflection

Languages differ in terms of what they express inflectionally and what they must express with independent words. English uses affixes for past tense, {-ed} and present tense (realized, e.g., as {-s} for third person singular). However, English lacks a future tense affix, using instead the independent word "will." A language like Latin has a rich inflectional system. Verbs agree with their subjects in number and gender, and can be inflected for three tenses and several moods; adjectives and nouns must agree in number and gender. Compared to Latin, English has an impoverished inflectional system, which has consequences elsewhere in the grammar; English constituent order is more fixed than Latin, and overt subjects are required in English but not in Latin, because the subject in Latin can be inferred from the verb.

Virtually all sign languages that have been studied have rich inflectional systems that free up constituent order. In ASL, although there is no grammatical expression of tense (see Neidle, Kegl, MacLaughlin, Bahan, & Lee, 2000, for an opposing, though highly controversial view), verbs can inflect for both subject and object agreement as well as a variety of aspects such as habitual, continuous, and inceptive.

that deaf children treat them as free forms, rather than as indivisible affixes on verbs.

**Derivational and Other Word-Formation Processes**

How do sign languages make new words with new or different content or form class? One example of a derivational process in English is the addition of the suffix -able to the verb believe to make it an adjective (believable) and then adding the prefix un- to negate it (unbelievable).

**Changing of Grammatical Category**

Supalla and Newport (1978) report on a subset of verbs that have corresponding nouns whose movements are different from those of the verbs. They suggest a derivational process for deriving nouns and verbs from one underlying form, adding the different types of movement when the derivation occurs. Typically, verbs have one continuous motion, while nouns have repeated, restrained movement.<sup>3</sup> When these derived forms enter inflectional processes such as continuous aspect, the differences in movement persist, since derivational morphological processes usually precede inflectional processes. Another example of a change of category would be the addition of the suffix AGENT to a verb like TEACH to create the noun TEACHER.

**Classifiers**

Classifiers are another way in which word formation in sign languages is highly productive (see Supalla, 1986). In this chapter, discussion is confined to classifiers that are represented by handshapes. When used in a verb of motion or location, a classifier functions roughly as an anaphoric pronoun; it refers back to a preceding noun (the antecedent). Here is a simple example, using what is generally known as a *handle* or *instrumental classifier* (cl.) in the dominant hand and a *semantic classifier* (cl.) in the nondominant hand:

- [6] dh: BOOK PUT<sup>CLHANDLE</sup>
- nh: cl: long flat object
- 'put the book (on a shelf)'

Classifiers are also used to coin new words. Once accepted, antecedents for these words are not required. Recent coinages involving handshapes in-

- [3] LONG-AGO ME SMALL ME GO-TO<sup>ASP</sup> FISH WITH GRANDFATHER
- 'When I was a child, I often went fishing with my grandfather.'

At the beginning of this discourse, a time adverbial, LONG-AGO is used to set the time frame. This time frame is assumed until and unless another time is indicated. This can occur with either another time adverbial (e.g. TOMORROW, meaning the next day in a past context) or a shift of the body forward to indicate a more future time or backward to indicate a more past time.

An indirect way of expressing past time is the use of the completive aspect form FINISH in ASL. In many languages, especially Creoles (Bickerton, 1981), aspect markers tend to become tense markers, but that process has not yet occurred in ASL.

- [4] YOU EAT FINISH
- 'Have you eaten yet??did you eat?'

With the exception of a couple of signs with which it fuses phonologically (e.g. SEE, HEAR), FINISH is still viewed as a separate word in ASL, hence by definition not a true tense marker.

Most other Western sign languages express time in the same way as ASL. However, there appear to be two true past tense markers in NS. One is a nonmanual behavior (NMB), a mouth-picture [po] as in NS:

- [5] Mouth: 'po.' (= past)
- fe: yng (= question)
- dh: ,tU,(you tell X)
- nh: ONNA [female.] (= object)
- eyegaze: to addressee (= subject)
- 'did you tell her?'

The other is a manual sign, distinct from the NS sign OWARU ("finish"). It cannot be separated from the verb, it never occurs except after a verb, and is accompanied by the mouthing [a], which is how the past-tense morpheme is pronounced in spoken Japanese.

Artificial sign systems (see Fischer, 1998) attempt to indicate tense with ASL forms such as PAST. However, Schick and Moeller (1992) show

**Aspect**

Sign languages also have rich inflectional means for marking aspect, which pays attention to things like beginning points or endpoints of an action or state, or the frequency of an action irrespective of time. Taking the example of GO-TO again, one can inflect it for habitual aspect by reduplicating it rapidly (Fischer, 1973). This reduplication changes the meaning (but not the core lexical meaning) of the sign in a predictable way, in this case, indicating to go to a place regularly. If the same sign is repeated with a slower, circular movement, the result is continuous aspect, and the sign means to go to a place repeated (but perhaps not regularly) for a long time (Fischer, 1973). If one begins to sign GO-TO but abruptly stops before the sign is completed, this is unrealized inceptive aspect (Liddell, 1984).

Adjectives and nouns can also undergo aspect marking; for example, the sign SICK can be inflected for habitual aspect, resulting in the meaning "sickly" (Klima & Bellugi, 1979). The sign SAME can be inflected for continuous aspect to yield the meaning "monotonous."

**Plural**

Many verbs can form plurals by reduplicating while sweeping the hands horizontally (Fischer, 1973). If one signs GO-TO and repeats it while moving the hands in a horizontal arc, the resulting meaning is "go to many places." For nouns, the movement need not be horizontal and the meaning may be irregular. For example, one can sign SIGNATURE repeatedly while moving the hands downward to mean a petition.

There are also other ways of forming plurals, depending partly on the sign's phonological makeup. The sign LOOK in ASL is made with two fingers extended on each hand, and can be made with only one hand. If one extends all the fingers except the thumb and uses both hands, the sign means "many people look."

**Tense**

As noted above, tense is an inflectional affix that indicates time. ASL indicates time but not tense. Instead, ASL uses adverbials, often at the beginning of a discourse, as time markers. For example:

**Agreement**

Two subclasses of verbs mark agreement with either source and goal (spatial verbs) or object and sometimes subject (agreement or inflecting verbs) (Padden, 1988). Both types of verbs do so by using referential loci (Bergman, 1980), points set up in space toward or away from which verbs move or face. In an agreement verb such as HATE, subject and object are directly encoded in the verb, both by the facing of the hands and the direction of movement (Meir, 1998). An ASL spatial verb like GO-TO can inflect for the endpoint of the action by changing its direction of movement. The ASL sign BRING (a spatial verb) moves from the real or established locus of the source (starting point) of the object to the real or established locus of the goal (endpoint). The subject of a spatial verb is not grammatically encoded and must be specified as in example 1.1:

- [1] ME BOOK BRING.
  - 'I bring/brought a book from point a to point b'
- A third category of verbs, "plain," does not inflect at all for subject, object, source, or goal.

Liddell (1995, 1996) has argued that referential loci are outside the linguistic system of ASL, although the grammar refers to them. Many scholars disagree with this view. One argument against Liddell is that there are grammatical constructions in both ASL and, more extensively, in NihonSyuwa (NS; the sign language of Japan), that abstract away from referential loci but otherwise do not differ from other aspects of the agreement system. This involves the replacement of a referential locus with a hand in neutral space, as in example 2:

- [2] dh: CONVINCe,
- nh: CL-person,
- 'convince him/her'

Other aspects of utterances like example 2 are discussed later. The point of this example for now is that it is the nondominant hand, which looks like the ASL number "1", rather than an established location for a previously discussed person, toward which the sign CONVINCe moves (Fischer & Osugi, 2000, call this an example of an indexical classifier).

according to van der Kooij (2002), lies in allowing the lexical structure of signs to contain a specification of (iconically driven) phonetic properties alongside a phonological structure. The two routes in phonetic predictability and iconicity allow significant 'cleaning up' of the phonology which, as a result, can be shown to be quite restricted and in accordance with structural principles that appear to play a crucial role in spoken language phonology as well (van der Hulst, 2000; see Mathur, 2001, for similar discussion regarding the specification of agreement).

**Sequencing**

As mentioned above, Stokoe's (1960) model of the sign presented the phonemes as being simultaneous. Yet signs do have beginnings and endings, and it is possible, for example, to perform a sign backwards; the result may be an actual sign or may be nonsense. Signers would not be able to sign backward if, in their minds, signs were truly simultaneous. Furthermore, rules for agreement make reference to beginnings and endings of movements.

Phonological sequencing in sign has been a productive area of research for almost 20 years. Some proposals are discussed here in a simplified form, not necessarily in agreement with the original authors. Newkrk (1998) first drew attention to the need to recognize sequential structure. Lidell and Johnson (1989) proposed a linear sequential structure consisting of holds (H) and movements (M) to which other elements attach. [HMH]. Later researchers (e.g., Perlmuter, 1992; Sandler, 1986) incorporated essentially the same notion while using position or location instead of hold. The sequential parts of the movement (initial location (L), movement, and final location) property came to be referred to as "segments" (also called "skeletal positions"), and the internally complex location/movement property [LML] reminded researchers of the notion of syllables. Even though sequential structure had now been recognized by collapsing location and movement into a linear structure, the three remaining units, handshape, orientation, and [LML], were still taken to be simultaneous. To bring this out and also to highlight the resemblance between the [LML] skeleton and the notion of syllable, other types of diagrams (e.g., example 10) came to be used instead of the one in example 9:

units below the level of the segment. In our example, [b] and [d] would share the features [+voiced], [-continuant], and [-nasal]. Phonological processes often apply to segments that share a particular feature. For example, in some languages, a voiced stop, whether it is [b], [d], or [g], might become voiceless when in final position in a word.

Can sign phonemes also be broken down further? There have been attempts to define distinctive feature systems that analyze, for example, the handshape unit into smaller, truly atomic parts (Boyes-Braem, 1981; Friedman, 1976; Hawes & Dauenhauer, 1978; Mandel, 1981). Some of the proposed possible features for handshape refer to spread versus closed fingers and number of fingers extended. In some cases, such as for movement and location units, it has proven to be more difficult to come up with a coherent set of features. Brentari (1998) and van der Kooij (2002) offer recent discussions of proposed feature systems. A problem with previously proposed systems of features is that they are too rich (i.e., they encode too much phonetic detail that does not matter for distinguishing segments). Van der Kooij (2002) argues that the nondistinctive nature of these phonetic properties is due to two sources: phonetic predictability and iconicity. With respect to phonetic predictability at the outset of studying any new language, signed or spoken, extreme precision is necessary because investigators do not know a priori what aspects of sound or gesture are truly distinctive. Proposals for a reduced set of features require phonetic implementation rules, which van der Kooij (2002) supplies. This topic is also discussed in Crasborn (2001).

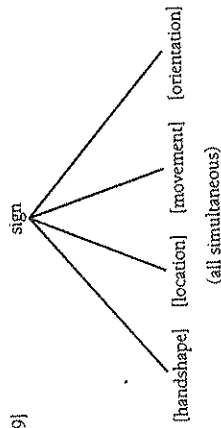
The iconicity argument is potentially controversial. It has long been noticed that many signs in sign languages are what is called "iconic" ("motivated"): aspects of the form of signs reflect aspects of the shape or action of referents. In early sign language work, it seemed crucial to de-emphasize the importance of iconicity to validate the claim that sign languages have duality of patterning (independence of form and meaning, claimed to be a defining property of human language) and thus have a phonology at all. However, given the obvious relevance of iconicity, the proper question is, how can both iconicity and phonological compositionality be accounted for? The answer,

**Phonology**

In spoken language, phonology is the level of analysis at which meaningless elements are combined to form meaningful elements. The notions of features, segments, and syllables are important units of phonological analysis, regardless of modality. Words are composed of smaller, meaningless segments such as in [b][æ][t] (bat). A change in any of these three segments may result in a different word (e.g., [k][æ][t] (cat), [b][i][t] (bit), [b][æ][g] (bag)) but [b] has no meaning by itself. A segment that makes a difference in meaning is called a "phoneme."

**Sign Parts**

Stokoe (1960) was the first linguist to realize that signs are not unanalyzed wholes. He analyzed signs into meaningless parts he called "cheremes," but which most linguists now call phonemes. The difference between spoken and signed languages, Stokoe pointed out, is that the phonemes in the former are sequential, while in the latter they appear to be simultaneous. Stokoe grouped his phonemes into three types: active handshapes (what moves), location (on face, body, or another hand), and movement. Later, orientation (the way that hands point or face or interact with each other) was added as a fourth phoneme type (Battison, 1978):



**Sign Features**

Let us return to the segment [b]. Is it an unanalyzable whole, or can it be analyzed further? A comparison of [b] with [d] reveals that they are similar in several respects but different in one: they are both voiced (cf. [p]), which is not (voiced); they are both stops (cf. [v], which is continuous), and they are both oral (cf. [m], which is nasal). But [b] and [d] differ in point of articulation. Linguists capture these similarities and differences through the level of "features," which are

dicating thin, flat objects include signs for laptop and handheld computers.

Classifiers as well as path movements are among the most iconic elements of sign languages; that is, there is a nonarbitrary connection between the sign and its referent. Of course, not all aspects of sign languages are iconic; sign languages contain many arbitrary elements, which is why there is no universal sign language and why users of one sign language cannot understand users of another. By the same token, the role of iconicity in spoken languages has often been minimized, pushed to the margins of sound symbolism. Spoken languages in fact differ in terms of how much iconicity they employ. In Bantu languages like Xhosa, there is a class of words called "ideophones" with a distinctive phonology for evoking sounds. Spoken Japanese also has a large repertoire of ideophones. The proportion of iconic elements in sign languages is probably higher than for spoken languages. Sign languages exploit iconicity because they can, again probably due to modality differences (Fischer, 1979; Mayberry, 1978). Most iconic elements discussed here have some characteristic form or movement that signs can imitate. However, typically there are no corresponding noises that spoken language could capture with speech sounds.

**Compounding**

As mentioned above, a compound is a word resulting from the combination of two other words. As described by Newport and Bellugi (1978), when two words or signs form a compound, certain deletions occur. For example, if the first member of the compound has repeated movement in isolation, the repetition of that movement is lost in a compound. This is analogous to the weakening of the vowel of the second member of a compound in English examples like "chairman." When a compound is reduplicated for plural or habitual, in ASL only the second member of the compound repeats. Compounding is still a very productive process in the sign languages of the world. Consider the following relatively new compounds in ASL:

- [7] NAKED\*ESCAPE  
'sreaker'
- [8] ELECTRIC\*M-A-I-L  
'e-mail' (ELECTRIC is usually signed with repeated movement, in the compound, only one movement occurs)

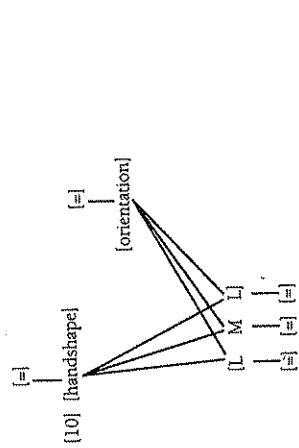
syllabic structure. When the vertical slicing is completed, the horizontal slicing divides individual segments into co-temporal features, organized into units such as place, manner, and voicing. Consequently, each feature is contained within a single segment (although this idea has been relativized in Goldsmith, 1979).

Stokoe's original insight that all properties of signs are simultaneous can be said to reflect the fact that in sign language horizontal slicing of the signal takes precedence over vertical slicing, making the result of the latter (syllable structure) subordinate to segmental structure. The sequential organization thus reflects a vertical slicing that effectively produces subphonemic syllabic structure. If this view is correct, single (monomorphemic) signs are monosegmental, while the smaller units of handshape, orientation, and location are subphonemic units on a par with subsegmental (simultaneous) units such as manner, place, and voicing in spoken language phonemes (van der Hulst, 1993, 1995, 2000). This difference between signed and spoken language seems due to the fact that visual information is available largely in parallel, whereas auditory information is available largely sequentially. (Apparent monomorphemic bisegmental signs are often frozen remnants of fingerspelled words, or frozen [hidden] compounds.)

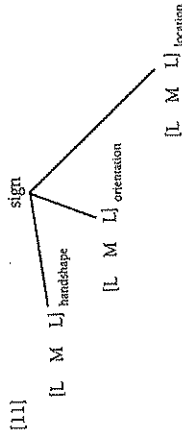
**Phonological Processes and Restrictions**

In contrast to the static aspects of sign language phonology discussed above, what happens when signs are combined both morphologically and syntactically remains a seriously understudied area of sign phonology, although phonological effects in word formation and sentence-level phenomena have been described (Brentani, 1998; Sandler, 1989; Wilcox, 1992). Below are three examples.

First, in compound formation the handshape or orientation of one member may replace or combine with the handshape of the other member. This process can apply either regressively (the handshape of the second member of the compound is used throughout the whole sign) or progressively (the handshape of the first member of the compound continues throughout the sign). This is a genuine case of assimilation, a phonological process that conspires to ensure the preferred one handshape per word. Such processes are an extension of the single handshape or orienta-



Each of the L and M units are linked to feature bundles ([=]) indicating location and properties of the movement, while handshape features and orientation features are spread over all positions in the skeleton. However, it is not the case that handshape and orientation always remain completely constant across all segments. Apart from movement of the whole hand (often called global or path movement), there can also be local movement involving either rotation of the hand (orientation change) or movement of the fingers (e.g., aperture change or wiggling). Thus the notion of movement is relevant not only in relation to the location of the whole hand, but also in relation to handshape and orientation. It would seem, then, that one needs to recognize three skeletons rather than one. In each case the units of the skeletons would have their features indicating beginning and end position and movement type (which are not indicated in example 11):



The diagram in example 11 seems to undermine the use of the term "syllable," because now there are three skeletons rather than one. There is, however, an interesting point to be made here which allows us coherently to maintain the terms "segment" and "syllable" cross-modally (van der Hulst, 2000). \* Phonological categorization of the phonetic substance proceeds in two dimensions: vertical (sequential) and horizontal (simultaneous). Spoken language has long been considered purely in terms of an absolute precedence of vertical slicing over horizontal slicing. The vertical slicing produces a sequence of segments that can be called

other parallels to English, while the basic structure of NS is subject-object-verb and has other parallels to Japanese. Grosjean (1996) has pointed out that most signers are to some degree bilingual, and it is common in bilingual situations for a dominant language to influence the structure of a minority one. It is, however, important to note that even if a sign language exhibits the same basic word order as the spoken language, the sign language is not necessarily therefore identical to the spoken language. Conversely, the fact that an utterance does not follow the word order of the spoken language does not automatically mean that it is grammatical in the sign language of the community; it may be ungrammatical in any language.

Another way in which the spoken language of a region influences its sign language is the use of the writing system, especially to expand vocabulary. ASL and NS use fingerspelling (letter-for-letter visual transcription of written words) in addition to lexical signs (Padden, 1991). Further, in ASL and some other sign languages, some signs, such as I, FAMILY, and IDENTITY are initialized; that is, the sign is made with a handshape that represents the fingerspelled first letter of the corresponding English word. Although critics have condemned initialization, its use probably goes back to Old LSF. The sign DOCTOR, for example was formerly made with an M handshape; the French for "doctor" is *médecin*. Asian sign languages also borrow elements of the writing systems of the spoken languages, the sign for PERSON in both NS and Chinese Sign Language (CSL) show the shape of the character 人, NS by drawing the character in the air, and CSL by placing the index fingers of each hand in a configuration to show its shape.

Elements of the writing system can become a more integral part of the sign language. Generally, a sign can have no more than two handshapes. When a fingerspelled word is further incorporated into ASL, medial letters will be lost and replaced by a movement envelope (Akamatsu, 1985), which becomes more salient as the word is integrated into the phonological system. Examples include #JOB and #EARLY, in which only the first and last letters are visible, while the dominant hand gains movement (Battison, 1978).

When parts of the writing system become more integrated, they can participate in inflection or derivation. In ASL, for example, the fingerspelled word N-O first became a borrowed sign #NO, changing

tion that occurs as the default case within simple signs.

Second, just as in spoken language certain sequences of segments are disallowed, in sign languages certain combinations of handshapes and orientations are not permitted. Thus, a user of English knows that "brick" is a real word, and "blick" is a possible word (it could be used to name a new detergent), but "brick" is not a possible English word. Analogously, in ASL, thumbs can touch only at the tips, which is why there is a difference in handshape between signs like SHOES (two "S" hands side by side with proximal sides touching) and WITH (two A hands facing, knuckles touching). In ASL "A" and "S" count as the same. The variants used in WITH and SHOES are determined by the fact that the knuckles of the thumbs cannot touch, so they effectively move out of the way. This constraint might not hold for other sign languages.

The third example concerns signs made with both hands. In these signs, either one hand functions as the place of articulation or both hands perform parallel actions with the same handshape. Brentani (1998) and van der Kooij (2002) have discussed one phonological process that drops one hand in two-handed symmetrical signs.

**Syntax**

This section discusses how sentences are put together in sign languages. A few examples beyond the level of the sentence are also discussed.

**Influence of Spoken Languages and Education**

In almost every country with a Deaf community, there will also be a sign language that is distinct from the spoken language of the community surrounding it. The families of sign languages do not coincide with spoken language-families; for example, ASL and Langue de Signes Française (LSF) are in the same family, but British Sign Language (BSL) is in a different family and is mutually unintelligible with ASL.

Through contact and education, spoken languages can influence the grammars of sign languages. It is probably no accident that the basic structure of ASL is subject-verb-object and has

would include HOW-MANY (the sign MANY accompanied by a wh-facial expression but with added upward initial movement) and WHAT-FOR (the sign FOR with repeated and somewhat restrained motion). The examples in 19 and 20 show that even a subject or object can be inferred from a wh-facial expression:

- Wh  
[19] HAPPEN  
'What happened?'  
Wh  
[20] EAT  
'What (are you) eating?'

Both our own investigations and reports of native signers have helped confirm the existence of covert wh-facial expressions in NS, CSL, and several European sign languages.  
As demonstrated in examples 17 and 18, in ASL (as in French), a wh-phrase can be fronted or can remain in its original position. How to analyze sentences like example 18 has been an object of intense discussion in recent sign language research. Petronio and Lillo-Martin (1997) have argued that such sentences are structured exactly like their English equivalent, while others (Nettle et al., 2000) have argued that the fronted wh-elements are in fact topics. (We agree with Petronio and Lillo-Martin because of sentences like example 13, which contains both a topic and a fronted wh-expression, which always must be in that order.)

Other structures in many sign languages also use NMBs for grammatical purposes. One is conditionals (if-then constructions; Baker & Padden, 1978, Fischer, 1978), which, like questions and topics, involve a brow raise; another is one type of relative clause (a clause that modifies a noun) first described by Liddell (1978); the NMB can involve a chin tuck and a tense grin.<sup>7</sup>

**Simple and Complex Structures**

Every language, signed or spoken, needs to express certain basic concepts and relationships. Some languages do so in the syntax, some with inflections, others with intonation. As discussed above, for example, a language like English expresses relations among elements almost entirely by using constituent order: "the cat chased the dog" differs from "the dog chased the cat" only in the order of elements,

in Kwa (Meter, 1983) to distinguish present from future.

A second way in which NMBs are important is in showing the scope of what logicians and linguists call operators such as negation and question. The NMB for negation is either a headshake or a frown (Baker & Coleky, 1980); the NMB for a yes/no question is a raising of eyebrows and widening of the eyes, possibly with other concomitant behavior. In ASL, the NMB for a wh-question involves eye-narrowing and furrowing of the brows. Consider these examples (fm = head nod):

- neg  
[15] ME UNDERSTAND PHYSICS, MATHEMATICS  
'I don't understand physics, but I do understand math.'  
fm  
[16] ME UNDERSTAND PHYSICS, MATHEMATICS  
'What I understand is not physics, but mathematics.'

In both examples 15 and 16, the line above the sentence indicates how far the NMB extends. Although the hands are doing the same thing, the meaning is different because what is being questioned or negated differs. Note that in these examples no inherently negative sign such as NOT is present; the negative facial expression serves as the only negator in the sentence. The same can occur in wh-questions. There are, of course, real wh signs such as WHO, WHERE, HOW, and so on. In addition, however, Lillo-Martin and Fischer (1992) have remarked the existence of what they call covert wh-constructions, words or phrases that are normally considered to be wh-words but are made so by the addition of a wh-facial expression. For example, if someone utters either example 17 or 18, they are asking what book the addressee is reading.

- Wh  
[17] YOU READ BOOK  
Wh  
[18] BOOK YOU READ

In fact, as Lillo-Martin and Fischer (1992) have suggested, there are a number of signs that have been considered ordinary wh-words in ASL that can be reanalyzed as ordinary signs with the wh-facial expression added; in some cases, there is also a phonological change in the sign as well. Example

**Topicalization**

In ASL, the use of classifiers and verb agreement necessitates a change from the basic word order. Most sign languages also have a process called "topicalization," where a noun phrase that the sentence or discourse is in some sense about (i.e., that represents the topic of the sentence) moves to the beginning of the utterance. The topic occurs with a special non-manual behavior (NMB) and continues until another topic is introduced (Fischer, 1973; Liddell, 1980). Notably, it does not need to be repeated in later sentences in a longer discourse, resulting in sentences with gaps that are filled in by the viewer who is cognizant of that discourse topic. An example of a topicalized structure is given below:

- i  
[13] BOOK, WHERE BUY?  
'As for the book, where did [you] buy [it]?'  
Generally, topicalization occurs only in main clauses, and the topicalized constituent must indeed move to the beginning of the sentence. It can, however, move from an embedded clause.  
[14] BOOK, WHO YOU THINK WANT BUY?  
'As for the book, who do you think wants to buy it?'

**The Role of Nonmanuals**

It has been suggested that in sign languages the face and the attitudes of the body serve the same function as intonation does in spoken languages. Signing without facial expression is certainly boring for deaf people, just as someone speaking in a monotone can put a listener to sleep. But NMBs such as facial expression and body shift are more than just intonation; in some ways they are closer to grammatical (or sometimes lexical) tone in spoken language, in that they contribute to differences in meaning. In some African languages (Goldsmith, 1979), a tone melody of high-low versus low-high can differentiate between present and past tense; in English, the noun "conduct" is stressed differently from the verb "conduct." In Chinese, depending on the tone, *ma* can mean "horse" or "mother." Recall that example 5 shows that in NS a mouth-picture like "po" can make a difference between present and past tense; this is analogous to the use of tone

the pronunciation of the N and gaining repetition. Then it became a verb meaning 'to say no to' and gained inflection for object, subject, and number. In NS, one can substitute number handshapes for the unmarked "1" in the sign for person and correspondingly modify the meaning to "two persons," "10 persons," and so on.

If deaf people are not exposed to the educational system, there is less chance for the spoken language to influence the sign language structure. Until recently, Thailand, for example, had no organized system for educating deaf children; Thai Sign Language makes little use of fingerspelling, and signed Thai (Thai Sign Language signs in spoken Thai order, analogous to using ASL or BSL signs in English word order) is quite rare (J. Woodward, personal communication, December 16, 2001). In contrast, some form of sign language has been used in American education for almost 200 years. In the United States, switching between signed English and ASL is quite common, especially in contexts where hearing people are present.<sup>5</sup>

**Basic and Derived Word and Constituent Orders**

As stated above, the basic constituent order of ASL is SVO, and the basic word order of NS is SOV. However, the grammar may have rules that change the basic order. Consider, for example, the use of classifiers. Because most classifiers are anaphoric, they require antecedents. Antecedents generally must precede classifiers. Assuming the classifier is in a predicate, that predicate must then occur last. Similarly, when an agreement verb requires that referential loci be set up first, the resulting sentence will have the order NP (noun phrase) NP verb. An example is:

- [12] COW, INDEX HORSE, INDEX KICK,  
'The cow kicked the horse.'

If the direction of the verb movement is reversed, the meaning will be "the horse kicked the cow." The presence of inflection makes the word order more flexible, and the necessity for an antecedent requires a change from the basic word order. Note that in an utterance such as that in example 12, the referential loci that attach to the verb are also anaphoric.<sup>6</sup>

yet clearly the meaning is different. Latin and ASL, in contrast, can show these kinds of relations by using different inflections; in Latin, those inflections tend to be on the nouns involved, whereas in ASL they tend to be on the verb (see Nichols, 1986, for discussion of these two types of languages). As with sign languages discussed earlier, all languages have to express negation and various kinds of questions. Below are some other structures found in sign languages.

*Clefts, or Rhetorical Questions*

Baker and Cokely (1980) describe a structure they call a rhetorical question (rh-9). It, too, uses a specific NMB. A simplified example is

- [21] P-A-T DUMB, WORK HERE GALLAUDET, <sup>t</sup>rh-q LIVE "WHAT" O-C.
- 'Pat's dumb; he works at Gallaudet, but where he lives is Ocean City.'

Wilbur (1995) argues that sentences like example 21 are not rhetorical questions at all (because rhetorical questions such as "are you kidding?" or "who do you think you are?" specifically are not answered). Rather, she suggests that these are what linguists call "pseudoclefts," as exemplified in the translation of example 21.

*Sentential Complements*

In addition to relative clauses and cleft structures, another common way of combining sentences in a language is to make a clause the subject or object of a sentence. English examples are given in examples 22-24, with the clauses underlined.

- [22] The doctor says that you should rest.
- [23] She regrets having said that.
- [24] For you to quit now would be impossible.

Not much has been published on the equivalents of these types of sentences in signed languages. Padden (1981) discussed infinitives in ASL. From our observations, the tendency seems to be to put the clause first, possibly as a topic, followed by the predicate to which it is attached; an example is

- [25] RAIN WILL, ME FEEL.
- 'I have a feeling it's going to rain.'

Paraphrases also occur; example 24 is really a conditional, and could therefore be signed as

- [26] YOU QUIT NOW IMPOSSIBLE

The expression of complex ideas in complex sentences is an area of sign language structure that clearly warrants more research.

**Summary and Conclusions**

The serious linguistic study of sign languages is still in its infancy, or at best adolescence; it has been going on for only about 45 years, compared with spoken language linguistics, which goes back well over 1,000 years. Sign languages have phonological, morphological, and syntactic structures that are as complex as those structures found in spoken languages. The same levels of analysis have been found for both signed and spoken languages. Contact with education in dominant spoken languages can influence sign language grammar, but, the channel in which sign languages are communicated has countervailing effects on the grammar, especially in simultaneity and iconicity. The space allotted here is obviously inadequate to provide a complete grammatical sketch of ASL or any other sign language. It is hoped that through highlighting important issues and references to other works that readers' appetite for further reading in this important area will have been whetted.\* Both for educational reasons and for its own intrinsic value, the linguistic study of sign languages clearly merits further study.

**Notes**

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- 1. The notational conventions used here are as follows: all signs are glossed in capital letters. ASL signs are represented with capitalized words in English, and Japanese signs are represented as words in Japanese. If one sign requires more than one spoken language word, the glosses are hyphenated, as in the gloss for LONG-TIME-AGO. Aspect marking is represented by superscripts, while locus and/or agreement marking is represented by subscripts. In more complicated examples, there are separate lines for each hand (dominant hand, rh-nondominant hand), as well as

separate lines to show the scope of facial expressions and other nonmanuals. Fingerspelled words are shown with hyphens separating letters, e.g., M-A-I-L. INDEX means a pointing gesture.

- 2. I.e. = facial expression, <sup>2</sup>U<sub>2</sub> shows second person subject and third person object.
- 3. It is important to note that not all verbs or nouns fit into this pattern. Specifically, some verbs have repeated motion already and do not have corresponding nouns.

4. van der Hulst (2000) and van der Kooij (2002) furthermore argue that the M unit in all three cases is superfluous.

5. It is not necessary for hearing persons to be present to have code-switching. Deaf-deaf dyads will code-switch as well; for a detailed discussion of influences on language choice in hearing people, see Ervin-Tripp (1972).

6. Padden (1990) argues that utterances like example 12 actually constitute a mini-discourse with each index constituting a separate predicate. If that is the case, then we would have a single-word predicate in the third sentence, \*KICK<sub>3</sub>, and the question of word order would be moot.

7. Fisher and Johnson (1982) argue that the clauses Liddell described are mostly those with definite heads (e.g., English "the boy" whom I saw). Relative clauses with indefinite heads (e.g., "a boy" who can help me) often use a different structure, as exemplified below, which does not have the characteristic NMB found by Liddell.

ME SEARCH MAN SELF HELP, WASHINGTON MACHINE  
 'I'm looking for a man who can help me with the laundry.'

8. Existing reference grammars include Baker & Cokely (1980) for ASL, Moody (1983) for LSF, Sutton-Spence & Woll (1999) for BSL, and Johnston (1989) for Auslan. Other useful sources include Wilbur (1987) and journals such as *Sign Language & Linguistics* and *Sign Language Studies*.

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