UNIT 3

Signs Have Parts

We know that one of the features that make language unique is that the symbols that make up language can be broken down into smaller parts. *Phonology* is the study of the smallest contrastive units of language. For spoken languages, those contrastive units are sounds, and linguists study how the sounds in a language are structured and organized.

Tools for Analyzing ASL

Identifying the Parts of Signs

Sign language linguists use the term *phonology* to refer to the study of how signs are structured and organized. ASL signs have five basic parts—handshape, movement, location, orientation, and nonmanual signals (facial expression). These basic parts are also known as parameters. Signs can share one or more of the same parameters. For example, the sign FEEL has the same handshape as the sign SICK, the same movement as the sign HAPPY, and the same location as the sign COMPLAIN. SUMMER and DRY differ in location, RED and CUTE in handshape, SHORT and TRAIN in palm orientation, and SIT and CHAIR in movement. However, these pairs share three parameters: SUMMER and DRY share handshape, movement, and orientation; RED and CUTE share movement, orientation, and location; SHORT and TRAIN share handshape, location, and movement; and SIT and CHAIR share location, handshape, and orientation (see Figure 10). It is the difference in one parameter that is responsible for the difference in meaning.

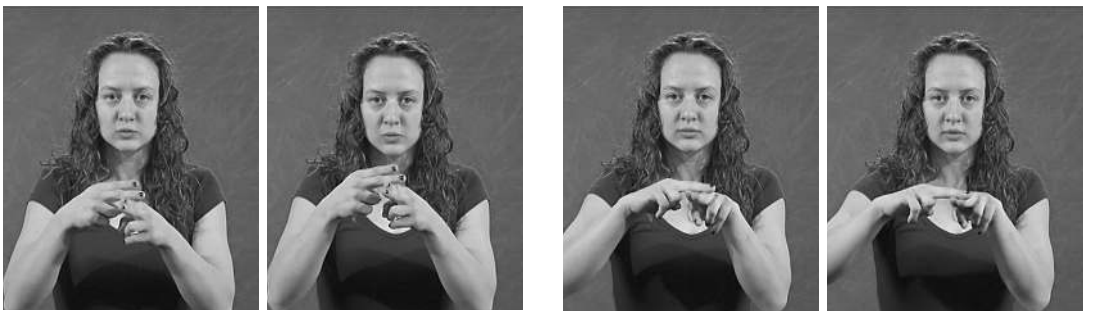
We know that signs have parts, and we must identify those parts in order to know the meaning of a sign. We know from signs like SUMMER and DRY that location must be an important part because SUMMER and DRY have different meanings, yet the only difference between the two signs is the location. Likewise, we know from signs like SIT and CHAIR that movement must be an important part because the only difference in the form of the two signs is the movement. The same is true of handshape for RED and CUTE and orientation for SHORT and TRAIN. The basic questions to be answered when analyzing pairs of signs are How do you know that pairs of

SUMMER DRY

Location

RED CUTE

Handshape



SOON TRAIN

Orientation

SIT CHAIR

Movement

Figure 10. Pairs of signs that differ in only one parameter.

signs have different meanings? and What part of the sign is responsible for the difference in meaning?

Nonmanual signals are the fifth basic part of signs. Many signs in ASL require a nonmanual signal in order to be produced correctly. Nonmanual signals are the facial expressions that accompany certain signs. For example, the sign NOT-YET is usually made with the mouth open and the tongue slightly out; the sign FINISH is made with the lips protruded. Without these nonmanual signals, the signs are not correct. As we will see, nonmanual signals are important at all levels of the language: for individual signs (lexical level), for building new signs and for making sentences (morphological and syntactic levels), and in the use of language by signers (discourse level).

When analyzing the distinct parts of signs, it is helpful to remember the following three points:

1. Make sure that the parts are indeed the same and not just similar. For example, the handshape of RESPONSIBILITY is a Bent B, the same as the handshape in COMPARE, but only similar to the handshape in BOOK.
2. Sometimes two English words are represented by the same sign. For example, SHOULD may sometimes be glossed as NEED, but the form of the sign is identical. The movement may differ depending on the meaning.
3. There are items that look like ASL signs in that they have handshape, movement, location, and orientation, but neither their meaning nor their function is ASL. For example, the sign BECAUSE has the same movement as FORGET or the same location as SUMMER, but BECAUSE is not an ASL sign. It is the result of codes invented to represent English manually.

Tools for Writing ASL

Linguists have different tools that they can use for writing ASL. One of these tools is *notation*, which allows linguists to write down signs and the nonmanual signals that accompany them. The can be done through two methods—*glossing* and *transcription*. The other tool is *translation*, which is the conversion of a message from one language into the grammatical form of another language.

Notation Methods

Glossing. A *gloss* is an English word that represents a sign. Linguists use glossing to write a signed utterance. Glossing is not the same as translating, but, like translating, it is sometimes a difficult task. A gloss of a signed story will be a series of English words, written in small capital letters, that correspond to the signs in the ASL story. Parts of English, such as plural markers, past-tense markers, and prepositions, do not appear in glossing unless they are produced in the specific story. The nonmanual features are indicated on a line above the sign glosses. Some basic conventions used for glossing are as follows:

1. Signs are represented with small capital letters in English; for example, CAT, HOUSE, STUDENT.

2. Lexicalized fingerspelled words are written in small capital letters and preceded by the # symbol; for example, #DO.
3. Full fingerspelling is represented by dashes between small capital letters; for example, M-A-R-Y.
4. Nonmanual signals and eye gaze can be represented on a line above the sign glosses or by placing the nonmanual signal after angle brackets around the part of the sentence that co-occurs with the nonmanual signal. For example, the English sentence *I love linguistics* can be glossed as follows:

   t
   LINGUISTICS, PRO-1 KISS-FIST or <LINGUISTICS>t PRO-1 KISS-FIST

In this example, the line above the gloss and the brackets represent nonmanual signals. The *t* over the line and after the brackets represents topicalization, which is marked by raised eyebrows (topicalization and other nonmanual signals will be explained in unit 15). Both ways of representing nonmanual signals will be used in this textbook.

Transcription. In addition to glossing signs into English, linguists have seen the need to devise a system for describing the structure of signs. We will discuss two systems that have been developed for describing the handshapes, locations, and movements of signs—the Stokoe system and the Liddell and Johnson system. These systems will be explained in later units; however, as an introduction to the concept of transcription, it is important to know the following three points:

1. In order for linguists to transcribe the structure of signs, they need to agree on the symbols used for describing the signs. These agreed-upon symbols are known as *conventions*, and they provide linguists with a consistent and predictable tool for transcription.
2. It is important that the transcription labels used be as precise as possible. The particular label for a handshape, a movement, or a location, and the arrangement of the labels in a particular way reveal something about the structure of signs.
3. The system chosen for labelling the parts of signs is a direct reflection of the researcher's perspective on the structure of signs. Transcription conventions do not exist in a vacuum, independent of linguistic theory. This point will be returned to in detail in discussion of the Stokoe system and the Liddell and Johnson system.

Translation

Translation is the representation of a message in one language into another language. Written messages in Italian can be translated into written English, for example. Messages signed in ASL can also be translated into written English. However, unlike glossing, translations do not include the nonmanual markers and other structural features that are represented in glosses.

On the DVD, you will find a story called "The Snowmobile." The gloss of the first sentence in this story is PRO-1 ONE STORY NEVER FORGET (PRO-1 is the first-person pronoun, "I"). This glossing provides an English word for every sign in the order the signs are produced (see Figure 11). You can see that even though these

t
PRO-1 ONE STORY NEVER FORGET
There's one story I'll never forget.

Figure 11. An example of a glossed sentence.

are English words, this is not an acceptable English sentence, but it helps us see what the signs are. Each one of these signs can be analyzed for its handshape, location, and other characteristics with specially devised symbols, or notations, which we will see in the discussion of the Stokoe and Liddell and Johnson systems. Finally, we can translate this ASL sentence to an acceptable English sentence: "There's one story I will never forget." All three of the writing tools are helpful for studying sign language structure.

Supplemental Reading

"Signs Have Parts: A Simple Idea," by Robbin Battison (1980); pp. 242–253

Homework Assignment 1

1. For each sign listed below, find another sign that has the same parameters for handshape, movement, and location.

	Same Handshape	Same Movement	Same Location
Example: FEEL	SICK	HAPPY	PRO-1. poss "my"

a. RESPONSIBILITY

b. FORGET

c. CUTE

d. ENJOY

e. BICYCLE

f. UGLY

g. BEST

h. WORSE

i. MONKEY

j. DISCUSS

2. What is the difference between the signs in each pair?

a. SUMMER/DRY

b. RED/CUTE

c. SHORT/TRAIN

d. SIT/CHAIR

3. What does each pair of signs have in common?

a. SUMMER/DRY

b. RED/CUTE

c. SHORT/TRAIN

d. SIT/CHAIR

4. List four signs that must have a nonmanual signal with them.

5. Look at "The Snowmobile" on the DVD. Gloss the first 90 seconds of the story. The first part is glossed here as an example.

t — head nod, eye blink

PRO-1 ONE STORY NEVER FORGET. HAPPEN PRO-1 ABOUT OLD TWELVE.

PRO-1. poss FAMILY HAVE TWO HOUSE. ONE HOUSE NORTH #MICH THAT-AREA,

MOTHER-FATHER HOUSE, AUNT UNCLE HOUSE HOUSES-IN-A-ROW.

Homework Assignment 2

1. Suppose you are the first linguist to describe ASL signs and you have to describe the handshape in each of the following signs. Pick a name for each handshape.

Example: SHOE S handshape

a. GIRL **g.** LECTURE **m.** MOTHER

b. ELEVATOR **h.** PREACH **n.** ALWAYS

c. SPAGHETTI **i.** PEOPLE **o.** PLATE (dish)

d. AWKWARD **j.** GIVE **p.** LOBSTER

e. TRAVEL **k.** MATH **q.** SHOULD

f. PLAY **l.** PITY **r.** MARRY

2. Pick a name for the location (place where the sign is made) of each of the following signs.

Example: KNOW face

a. PLAY **e.** FACE **i.** STRICT

b. NOT **f.** YESTERDAY **j.** BROKE (no money)

c. FEEL **g.** HOSPITAL **k.** PUNISH

d. DOCTOR **h.** TIME **l.** DUTY

3. Pick a name for the movement in each of the signs listed below.

Example: HELP upward

a. OPPRESS **f.** MAYBE **k.** TRAVEL **o.** DIVIDE

b. BUSY **g.** SELL **l.** COMMUTE **p.** DIE

c. KEY, LOCK **h.** YES **m.** CLEAR **q.** FASCINATING

d. BOIL **i.** COFFEE **n.** APPROACH **r.** CONTACT

e. RELATED **j.** MISS (didn't see something)

4. Using the labels you have picked for handshape, location, and movement, describe the following signs.

a. CHILDREN **c.** TRAIN **e.** DEAF

b. PLAY **d.** UNDERSTAND **f.** GIVE

UNIT 4

The Stokoe System

In unit 3, we saw that ASL signs have internal structure; that is, that they can be broken down into smaller parts. Those parts include handshape, location, movement, palm orientation, and nonmanual signals. In this unit, we examine the first system devised for the formal description of signs. Homework Assignment 2 introduced you to labelling systems. In the first section, you described the handshape for each sign; in the second and third sections you described the location and the movement of signs. You have probably discovered that there may be different solutions to the same problem. For example, the handshape of PREACH can be described as a *9* or as an *F*; there are different signs for LOBSTER; both BUSY and COMMUTE can be described as having a back-and-forth movement.

The realization that emerges from the homework assignment is that there is a need for consistency and uniformity in a descriptive system. Arguments can be made for choosing either *9* or *F* as the label for the handshape in PREACH, but once a choice of label has been made, it must be used consistently. In addition to consistency, there is a need for precision, so that if the movement in both BUSY and COMMUTE can be described as *back and forth*, some way must be created to uniquely describe the movement in each sign. The movement in some signs, such as APPROACH or DIVIDE, may be difficult to describe, making the need for precision in descriptions even more important.

The Stokoe System

William C. Stokoe devised the first system for describing signs. Before Stokoe, signs were thought of as unanalyzable wholes, with no internal structure. Stokoe was the first to suggest that signs could be analyzed in the same way that the units of spoken language can be analyzed. In 1960, Stokoe proposed that signs have three parts (parameters) that combine simultaneously. The three parts are the location of the sign, which he called the *tabula* or *tab;* the handshape, which he called the *designator* or *dez;* and the movement, which he called the *signation* or *sig.* Palm orientation and nonmanual signals were dealt with indirectly in the Stokoe system.

Stokoe referred to the three parameters as *cheremes*, from the Greek word *cheir*, for hand. He saw cheremes as meaningless elements that combine to form all signs, in the same way that phonemes combine to form words in spoken languages. Each parameter has a set of members known as primes. For example, handshape primes include *A*, *B*, and *5*; location primes include face, nose, and trunk; movement primes include upward movement, downward movement, and movement away from the signer. Figures 12 and 13 show the symbols used for writing the signs of ASL, as they appear in *The Dictionary of American Sign Language* (1965) by William C. Stokoe, Dorothy C. Casterline, and Carl G. Croneberg. In Stokoe's system, cheremes were written down in a specific order—TD^{S}. That is, the location of the sign (tab) was written first, followed by the handshape (dez), and then the movement (sig). For example, the sign IDEA is written as follows:

∩ | ∧

∩ indicates the forehead location, | represents the handshape, and ^ represents the upward movement. Another example is the sign for "I" or "me." The midchest location is indicated by [ ]. The handshape is represented by G, x represents contact, and ⊤ represents movement toward the signer. All together, it looks like this:

[ ]G$^{x}_{\top}$

tab dez sig

Stokoe's system allows for some variations on the basic TD^{S} representation of signs. Signs with two hands are represented as TDD^{S} (for example, WITH ØA$^{|}$A^{x}, where the x indicates the two hands contacting each other); signs with one movement and then another are shown as TD^{SS} (for example, MILLION B$\alpha\ddot{B}^{x\perp\dot{x}}$, where $^{\dot{x}\perp\dot{x}}$ represents the repeated contact on the palm of the weak hand).

In the Stokoe notation system, the weak hand is regarded as the location for the sign, as shown in the following example (see Figure 14).

COOK B$_{\alpha}$B$_{\beta}{}^{x\alpha x}$

PICK-ON G∧X∨^{x}

The signs PRO-1.poss ("my"), PRO-1 ("I, me"), and THINK are similar but show some contrasts. Here is how they look in the Stokoe system (see Figure 15):

PRO-1.poss	PRO-1	THINK
[ ]B$_{\top}{}^{x}$	[ ]G$_{\top}{}^{x}$	∩G$_{\top}{}^{x}$

Tab symbols

1. Ø zero, the neutral place where the hands move, in contrast with all places below
2. ∩ face or whole head
3. ⌒ forehead or brow, upper face
4. △ mid-face, the eye and nose region
5. ∪ chin, lower face
6. ʒ cheek, temple, ear, side-face
7. Π neck
8. [] trunk, body from shoulders to hips
9. \ upper arm
10. √ elbow, forearm
11. ɑ wrist, arm in supinated position (on its back)
12. ɒ wrist, arm in pronated position (face down)

Dez symbols, some also used as tab

13. A compact hand, fist; may be like 'a', 's', or 't' of manual alphabet
14. B flat hand
15. 5 spread hand; fingers and thumb spread like '5' of manual numeration
16. C curved hand; may be like 'c' or more open
17. E contracted hand; like 'e' or more claw-like
18. F "three-ring" hand; from spread hand, thumb and index finger touch or cross
19. G index hand; like 'g' or sometimes like 'd'; index finger points from fist
20. H index and second finger, side by side, extended
21. I "pinkie" hand; little finger extended from compact hand
22. K like G except that thumb touches middle phalanx of second finger; like 'k' and 'p' of manual alphabet
23. L angle hand; thumb, index finger in right angle, other fingers usually bent into palm
24. 3 "cock" hand; thumb and first two fingers spread, like '3' of manual numeration
25. O tapered hand; fingers curved and squeezed together over thumb; may be like 'o' of manual alphabet
26. R "warding off" hand; second finger crossed over index finger, like 'r' of manual alphabet
27. V "victory" hand; index and second fingers extended and spread apart
28. W three-finger hand; thumb and little finger touch, others extended spread
29. X hook hand; index finger bent in hook from fist, thumb tip may touch fingertip
30. Y "horns" hand; thumb and little finger spread out extended from fist; or index finger and little finger extended, parallel
31. 8 (allocheric variant of Y); second finger bent in from spread hand, thumb may touch fingertip

Sig symbols

32. ^ upward movement } vertical action
33. v downward movement
34. ᴎ up-and-down movement
35. > rightward movement } sideways action
36. < leftward movement
37. z side to side movement
38. ᵀ movement toward signer } horizontal action
39. ⊥ movement away from signer
40. ɪ to-and-fro movement
41. ɑ supinating rotation (palm up) } rotary action
42. ɒ pronating rotation (palm down)
43. ω twisting movement
44. ŋ nodding or bending action
45. □ opening action (final dez configuration shown in brackets)
46. # closing action (final dez configuration shown in brackets)
47. ᵴ wiggling action of fingers
48. ⊛ circular action
49.)(convergent action, approach } interaction
50. × contactual action, touch
51. ⌶ linking action, grasp
52. † crossing action
53. ⊙ entering action
54. ⁺ divergent action, separate
55. ‘’ interchanging action

Figure 12. Stokoe's symbols for writing the signs of American Sign Language.

Note: Reprinted by permission of the publisher, from W. C. Stokoe, D. C. Casterline, and C. G. Croneberg, *A Dictionary of American Sign Language* (rev.). (1976): x–xii, Silver Spring, MD: Linstok Press.

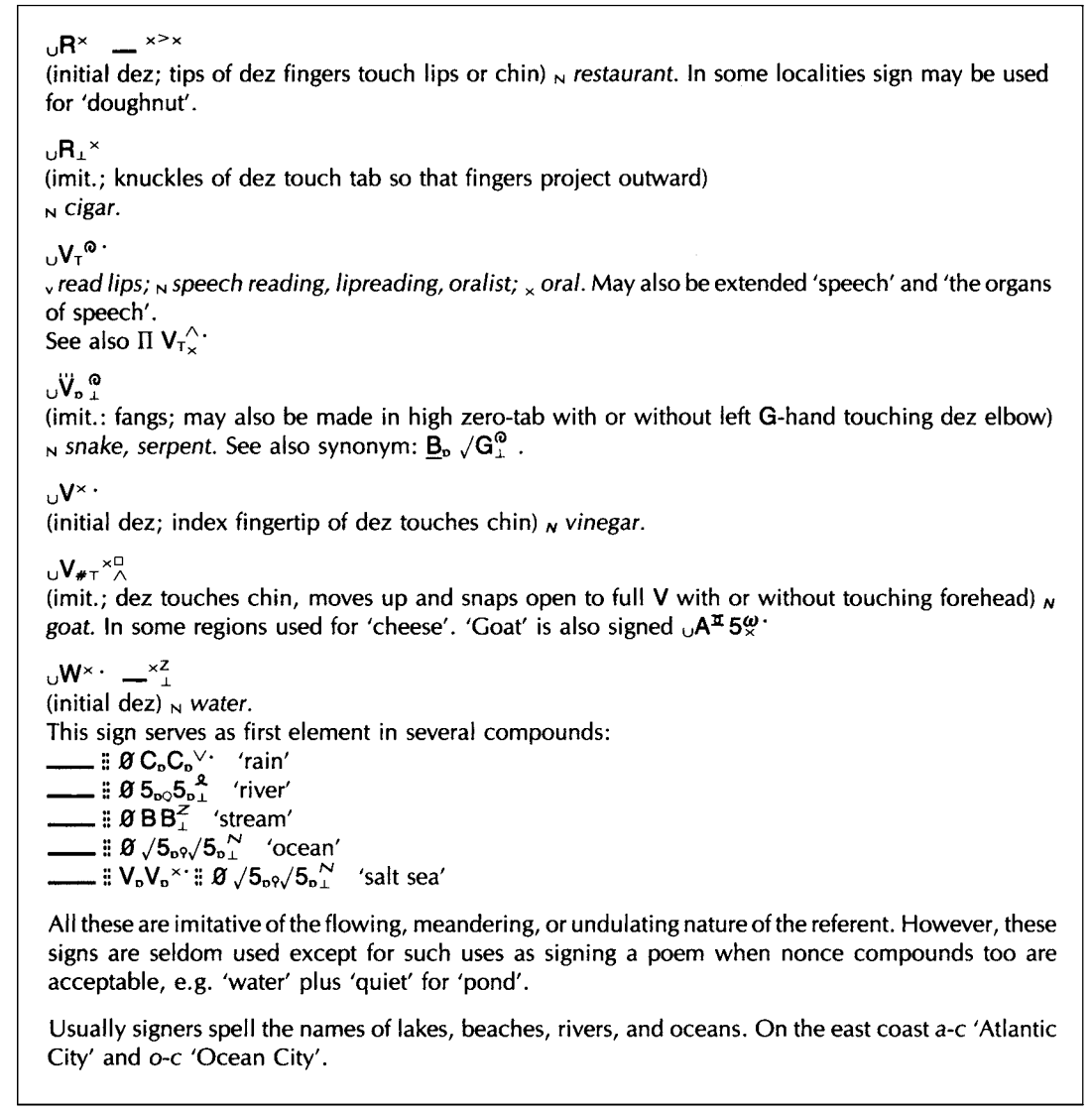


Figure 13. Examples of Stokoe's transcription system.

Note: Reprinted by permission of the publisher, from W. C. Stokoe, D. C. Casterline, and C. G. Croneberg, A *Dictionary of American Sign Language* (rev.). (1976): 168, Silver Spring, MD: Linstok Press.

COOK $B_a B_b^{xax}$

PICK-ON $G \wedge X \vee^x$

Figure 14. Weak hand as location.

PRO-1.poss ("my") [ ]$B_{\top}^{x}$

PRO-1 ("I," "me") [ ]$G_{\top}^{x}$

THINK $\cap G_{\top}^{x}$

Figure 15. Sign contrasts.

Supplemental Reading

"Introduction," to *A Dictionary of American Sign Language*, by William C. Stokoe (1965; 1976); pp. 254–269

Homework Assignment 3

1. Using the Stokoe symbols for movement, location, and handshape, transcribe the following signs:

a. ENJOY
b. BEGIN
c. BROKE (NO MONEY)
d. BUSY
e. SUNDAY
f. EVERY SATURDAY
g. KNOW
h. NOT

UNIT 5

The Concept of Sequentiality in the Description of Signs

In unit 4, we discussed the transcription system devised by William Stokoe for describing ASL signs. Stokoe's work clearly represents the beginning of linguistic analysis of sign language structure. In this unit, we will focus on two issues relating to sign language structure that emerge from Stokoe's system—the level of detail needed to describe ASL signs, and the representation of sequence in ASL signs.

Detail in the Description of ASL Signs

According to Stokoe's system, the location for the signs HEAVEN, SIGN, and CHILDREN is described as Ø, or "the neutral place where the hands move," in contrast with other specific locations on the body such as nose, neck, or arm. Similarly, the handshape for GIVE, NUMBER, and NOTHING is described as O. In the case of the location, the description Ø does not show that the signs HEAVEN, SIGN, and CHILDREN are in fact produced at distinctly different levels (see Figure 16). To produce the sign HEAVEN at the level at which SIGN is produced would be unusual; likewise, to produce the sign CHILDREN at the level at which HEAVEN is produced would be unusual. The description of the location for each sign needs to be more specific. The description Ø is not specific enough. And while the handshape of GIVE and NUMBER may look the same, the handshape for NOTHING is quite distinct. The description of O for the handshape of these three signs is not specific enough (see Figure 17).

The Representation of Sequence in ASL Signs

Some ASL signs have only one handshape, one movement, one location, one palm orientation, or one nonmanual signal. For example, the sign MOTHER has only one handshape; the sign UNDERSTAND has one location; the sign COLOR has one handshape and one location; and the sign MAYBE has one palm orientation. However, many ASL signs have more than one handshape, location, palm orientation, or

HEAVEN SIGN CHILDREN

Figure 16. Signs that are described in Stokoe's system as having the same location.

GIVE NUMBER NOTHING

Figure 17. Signs that have the same handshape, according to Stokoe's system.

nonmanual signal. That is, many ASL signs have a sequence of handshapes, locations, palm orientations, or nonmanual signals (see Figure 18). Examples of such sequences are as follows:

handshape:	UNDERSTAND	X → 1
location:	DEAF	ear → chin
palm orientation:	DIE (1-handed)	palm down → palm up
nonmanual signals:	FINALLY	closed lips → mouth open

In the Stokoe system, a sequence of two movements is shown in the movement part of the transcription. The sign MILLION would be written as follows:

MILLION $Ba\ddot{B}^{\dot{x}\perp\dot{x}}$

This notation means that the Bent B handshape of the active hand ($\ddot{B}$) contacts the weak hand (palm up, Ba) once in a sharp movement ($\dot{x}$) and then moves away from the signer ($\perp$) and repeats the contacting movement ($\dot{x}$). The sequence of movements, then, is represented as $\dot{x}\perp\dot{x}$. In the Stokoe system, when there is a sequence

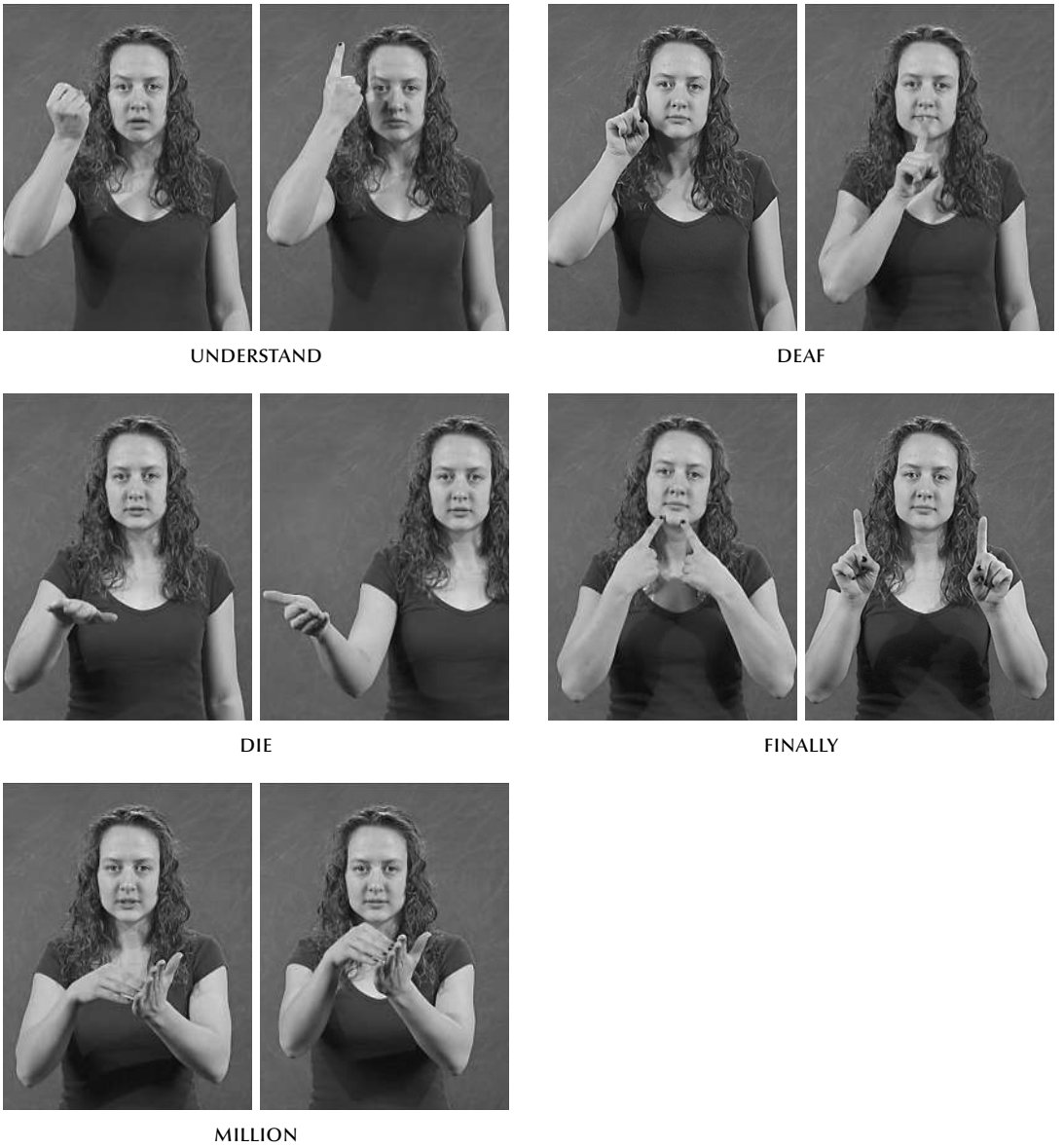


Figure 18. Example of sequence in ASL signs.

of handshapes, orientations, or locations, the change is shown in the movement portion. For example, UNDERSTAND has two handshapes, X and G (in the Stokoe system), and the second handshape is shown with the movement

$$\frown \mathrm{X}_{\top} \square\ [\mathrm{G}]$$

This notation means that the handshape X is oriented toward the signer (⊤) at the forehead (⌒) and that there is an opening action (□) that results in the handshape G.

The sequence of orientation in the sign DIE is shown in the movement

ØBɒ^{a}

This notation means that the hand begins with the palm down (Bɒ). In the course of producing the sign, the orientation of the hand changes so that ɒ becomes ɑ.

In one variant of the sign DEAF, the G handshape moves upward (^), contacts the chin (x) and then moves up and back and contacts the cheek. The sign is represented as follows:

∪G∧$^{x\top x}$

So the sequence of locations is shown by x⊤x.

Minimal Pairs

It is not that the Stokoe system ignores sequences of handshapes, locations, and orientations. These sequences are seen as a function of the movement component. It is essential to understand that in Stokoe's system these sequences are seen as secondary to the description of signs. What this means is that he proposed a structure for sign language that is different from the structure of spoken language at its most basic level. To clarify this point, we must examine one of the most basic concepts in the phonology of any language, that is, the concept of contrast.

In English, we are able to isolate and describe the basic parts of English phonology *(phonemes)* because of word pairs that are called minimal pairs. An example of a minimal pair are the words *pat* and *bat*. These words are contrastive in meaning (that is, they mean different things), and they are identical in all segments (parts that occur in sequence) except one. Furthermore, the two segments that contrast, *p* and *b*, differ in only one feature: *b* is produced with vibration of the vocal cords and is called a voiced sound, while *p* has no vibration and is voiceless. The following diagram analyzes the segments of the minimal pair *pat* and *bat* (æ is the symbol used to represent the vowel):

	p	æ	t	b	æ	t
place of articulation:	bilabial		alveolar	bilabial		alveolar
manner of articulation:	stop		stop	stop		stop
voiced or voiceless:	voiceless		voiceless	voiced		voiceless

The features that are listed under each sound are referred to as a bundle of articulatory features, and *p* and *b* differ in only one of these features—voicing. We know that *p* and *b* must be contrastive phonemes in English (that is, they must be among the basic building blocks of the language) because two sequences of sounds that are otherwise identical have different meanings, and that difference in meaning must be linked to the difference between *p* and *b*. The kind of contrast demonstrated by *pat* and *bat* is called sequential contrast.

Sequential contrast is different from simultaneous contrast (that is, distinctions of one feature within a single, co-occurrent bundle of features). As we just saw, the contrast between the English sounds *p* and *b* (when these sounds are not in a

sequence of sounds) is an example of simultaneous contrast. Both *p* and *b* consist of co-occurrent features, and they differ only in one of those features, namely, voicing. Similarly, in the Stokoe view of signs as simultaneously produced parameters, there are many pairs of signs that are in contrast. For example, in the Stokoe system, the following pairs of signs are considered minimal pairs.

SUMMER	DRY	contrast in location
SIT	CHAIR	contrast in movement
RED	SWEET	contrast in handshape

In all of the pairs, the signs differ in only one of the co-occurrent parts.

In the Stokoe system, contrast is seen as simultaneous contrast, and the issue of sequential contrast is not discussed. However, there are examples of sequential contrast in ASL, and because these examples exist, a system for describing ASL structure must be able to describe and account for any sign in the language. An example of sequential contrast in ASL can be seen in the pair of signs CHRIST and CONGRESS. CONGRESS is produced with a sequence of locations on the upper chest; this form of CHRIST is produced almost exactly like CONGRESS, except that its final location is the lower torso. The contrast between the two signs lies in the difference in one feature, the final location. Similarly, in the one-handed version of the sign CHILDREN, the palm orientation is down, while in the one-handed version of DIE, the palm is down and then up. The contrast between the two signs is in the sequence of orientation, down-down as opposed to down-up.

The Dictionary of American Sign Language (DASL) describes the location of the sign GIVE as Ø, the neutral location for signs without body contact. However, the contrast between the signs FIRST-PERSON-GIVE-TO-THIRD-PERSON and THIRD-PERSON-GIVE-TO-FIRST-PERSON is precisely in the location, and both of those signs show a sequence of locations.

It is very important to understand that many signs have sequences of handshapes, locations, orientations, or nonmanual signals but that the sequence is not contrastive. For example, some signs show a sequence of nonmanual signals, as with the sign ADMIT, which first has the lips pursed as the palm contacts the chest, and then the mouth opens as the hand moves away from the chest. A similar sequence occurs in one version of the sign FINALLY as the hands change orientation (see Figure 19). Without these nonmanual signals, the signs are not properly produced, and the sequence within the nonmanual signal cannot be reversed. It is not possible to begin with an open mouth and end with closed lips. It would seem then that sequence in nonmanual signals is very important.

Many signs have a sequence of locations; that is, first one and then the other. For example, the sign DEAF begins just below the ear and ends on the chin. However, it can begin the other way around, on the chin, and end just below the ear. This is an example of variation in ASL, variation that occurs for stylistic or regional or grammatical reasons. What is important is that the variation lies in the sequence of locations. Since the sign means the same thing whether it begins at the ear or the chin, it is not an example of contrast, but the sequence of locations still is important in understanding the structure of ASL and how it can vary.

FINALLY (no mouth movement) FINALLY (with mouth movement)

Figure 19. Two versions of FINALLY.

It is important to remember that sign languages show sequential contrast in the same way that spoken languages do, and it is very important for the system used to describe the sign language to represent that fact.

Summary

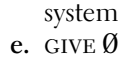
The following list summarizes some of the problems with the Stokoe transcription system.

1. Detail in the description of ASL signs. For example,

	Location
HEAVEN	Ø
SIGN	Ø
CHILDREN	Ø
	Handshape
GIVE	O
NUMBER	O
NOTHING	O

2. The representation of sequence in ASL signs.
   - **a.** MILLION BɑB̈ẋ⊥ẋ Movement repeated, sequence of movement.
   - **b.** CONGRESS and CHRIST both have a sequence of location, and the only difference between them is the final location. However, in the Stokoe system, this sequence of location is not shown. They are transcribed as follows:
     CONGRESS []C$^{x>x}$
     CHRIST []C$^{x\vee x}_{>}$
     The same location is given for both, **[]**, which means "trunk, body from shoulders to hips."
   - **c.** DIE BɒBɑ$^{q}_{b}$
     The two-handed sign has two orientations in sequence (R: palm up→down; L: down→ up), and that is shown in the movement. However, signs like one-handed DIE and one-handed CHILDREN, which each have a sequence of orientations and seem to differ only in orientation, are not distinguished as such in the Stokoe system.

d. DEAF 
The sign has two locations in sequence (chin→ cheek), and that is shown in the movement. This sign also can be made from cheek→ chin. The Stokoe system does not show this.

e. GIVE 
The specific location of the hand provides information about who is the subject and who is the object of the verb. The Stokoe system does not include this information.

f. ADMIT and FINALLY are among the many signs that include a nonmanual signal. The parts of the nonmanual signal must be produced in sequence. However, in the Stokoe system, no mention is made of the nonmanual signal, much less of the fact that the parts of the signal must occur in sequence.

SUPPLEMENTAL READING

Files 3.1, 3.2, 4.1, 4.2, and 4.3 from *Language Files: Materials for an Introduction to Language and Linguistics* (2004); pp. 270–291

UNIT 6

The Liddell and Johnson Movement–Hold Model

In unit 5, we examined ways in which the transcription system devised by Stokoe cannot adequately describe the structures of signs, specifically in the areas of level of detail and sequentiality. In units 6 and 7, we will very briefly describe a system developed by Scott K. Liddell and Robert E. Johnson. We will refer to this system as the Movement–Hold Model. Though details of the model are numerous and complex, its basic claims about sign language structure are important. The basic claims reflect a perspective about the structure of signs that significantly differs from Stokoe's perspective, and it is important to understand that difference in perspective.

The basic claim about the structure of signs in the Movement–Hold Model is that signs consist of hold segments and movement segments that are produced sequentially. Information about the handshape, location, orientation, and nonmanual signals is represented in bundles of articulatory features. These bundles of articulatory features are similar to the ones we described in unit 5 for the sounds of spoken languages. Holds are defined as periods of time during which all aspects of the articulation bundle are in a steady state; movements are defined as periods of time during which some aspect of the articulation is in transition. More than one parameter can change at once. A sign may only have a change of handshape or location, but it may have a change of both handshape and location, and these changes take place during the movement segment. For example, in the sign UNDERSTAND, only the handshape changes; in the sign FALSE, only the location changes; however, in the sign FASCINATING, both the handshape and the location change, while the sign is moving.

Liddell and Johnson developed a transcription system in order to record the movement (M) and hold (H) segments of each sign. As their model developed, they began to notice differences in the length of hold segments in some signs. For example, they observed that the initial hold segment in the sign THINK was shorter than the final hold. To accommodate this difference they introduced the "X"

segment to capture the fact that the length of some holds could be altered without changing the meaning of the sign.

The transcription system uses the term *strong hand* to describe the active hand and the term *weak hand* to describe the hand acted upon. Right-handed signers more often than not use their right hand as their strong hand while left-handed signers use their left hand. Sometimes, however, signers switch their hand dominance, but the Liddell and Johnson transcription system allows for this to be noted. The examples that follow demonstrate how the transcription system works.

The first example is a simplified Movement–Hold transcription schema for the sign WEEK. In this schema, the production of the sign is broken down into specific units, and different aspects of the sign are noted. The timing unit describes each segment; in other words, whether it is a movement, a hold, or a shortened hold. Contour allows a specific movement shape to be described (for example, straight vs. curved). If contact occurs during a segment, a plus sign (+) is inserted in the chart. The schema also allows linguists to record the hand configuration used in the sign (handshape), the focal site where the hand is placed (placement/location), the direction the palm faces in relation to the body (rotation/orientation) and any nonmanual signals that accompany the sign.

WEEK

			Unit 1	Unit 2	Unit 3	
	Timing Unit		X	M	H	
	Contour					
	Contact		+	+	+	
	Local Movement					
Strong Hand	Handshape		1		1	articulatory bundle
	Placement (Location)	focal site	Base of palm of weak hand		Fingertips of weak hand	
	Rotation (Orientation)		Palm facing down		Palm facing down	
	Nonmanual signal					
Weak Hand	Handshape		B		B	articulatory bundle
	Placement (Location)	focal site	In front of torso		In front of torso	
	Rotation (Orientation)		Palm facing upward		Palm facing upward	
	Nonmanual signal		—		—	

The sign WEEK begins with the shorter hold (X), with the strong hand at the base of the palm of the weak hand. The strong hand then moves (M) to the fingertips of the weak hand and ends with a full hold (H) in that location. The only change in this sign is in the location of the strong hand, from the base of the palm to the fingertips of the weak hand.

The one-handed sign GUESS is notated as follows:

GUESS

			Unit 1	Unit 2	Unit 3	
	Timing Unit		X	M	H	
	Contour					
	Contact					
	Local Movement					
Strong Hand	Handshape		C		S	articulatory bundle
	Placement (Location)	focal site	Ipsi nose		Contra nose	
	Rotation (Orientation)		Palm facing upward		Palm facing downward	
	Nonmanual signal		—		—	

This sign begins with a shortened hold (X) on the strong side (also referred to as ipsilateral or ipsi) of the nose at about eye level. It moves to the weak side (also referred to as contralateral or contra) and ends in a hold near the weak side cheek. The sign begins with a C handshape and ends with an S handshape. The palm orientation begins with the palm facing slightly upward and ends with the palm facing downward.

Not all signs have a hold-movement-hold (X M H) structure (see Table 1). While there are at least nine possible sign structures, H M is not among them (see Figure 20). As you can see, not all combinations are acceptable in ASL structure.

Table 1. Possible Sign Structures

Structure	Sign
Hold (H)	COLOR, STARE
X M H, unidirectional[a]	ME, THINK
H M H, unidirectional	GOOD, UNDERSTAND
X M$_{osc}$ X or H M$_{osc}$ H, oscillating movements[b]	LIGHT-YELLOW or DREAM
X M X M X M H, simple reduplicated,[c] unidirectional	SCHOOL, AIRPLANE
X M X M X M H, 3 movements, not reduplicated	DEAF, RESTAURANT
X M X M X M X M X M X, 3 focal sites,[d] 5 movements	GOAT, CHINA (new version)
X M X M H or H M X M H, 2 movements, not reduplicated	SODA-POP, DESTROY
X M X M X M X M X M X M X, repeated bidirectional movement[e]	MAYBE, INTERPRET

[a] *Unidirectional* signs are produced in a single direction. For example, GOOD moves in one direction away from the signer.

[b] *Oscillating* movement means that the movement is contained within the hand itself and does not involve a change of location.

[c] *Reduplicated* movement occurs when a sign begins in one location, ends in another location, and then the entire sequence is repeated.

[d] *Focal sites* indicate where signs are produced. The focal site of THINK is on the forehead. A sign can have more than one focal site. The international sign for CHINA has three—the weak side shoulder, the strong side shoulder, and the strong side near the hip.

[e] *Bidirectional* signs move in two directions. In the sign MAYBE, the hands alternate moving up and down.


COLOR H


GOOD H M H


THINK X M H


LIGHT-YELLOW X M X


SCHOOL X M X M X M H


DEAF X M X M X M H


SODA-POP X M X M H


CHINA X M X M X M X M X M X


MAYBE X M X M X M X M X M X M X

As you can see in Table 1, the structure of GOOD is H M H while the structure of THINK is X M H. This is because the initial hold of GOOD is longer than the initial hold of THINK. Though the details of the Liddell and Johnson Movement–Hold transcription system are beyond the scope of this course, it is important to understand four basic components of the system.

1. The Liddell and Johnson system makes the claim that the basic units of signs — movements and holds — are produced sequentially. The information about handshape, location, orientation, and nonmanual signals is represented in bundles of articulatory features found in each unit. This claim is very different from Stokoe's assertion that the parameters of signs are produced simultaneously, but it parallels theories of the segmental structure of spoken languages. Liddell and Johnson claim sign languages and spoken languages are the same in their basic structure, adding support to arguments that sign languages are legitimate and viable languages. Sign languages are not unlike spoken languages, as Stokoe said. They are like them in the most basic way.
2. The Liddell and Johnson system solves the descriptive problems presented by the Stokoe system. It clearly shows that sequence is very important and contrastive in some signs, and it allows sequences to be described efficiently.
3. The Liddell and Johnson system provides adequate detail for the description of signs. Stokoe clustered the A, T, and S hand configurations into one handshape, despite their possible contrastive use. Stokoe counted 19 handshape primes, while Liddell and Johnson counted more than 150. This level of detail allows the system to document any sign language. In addition, the location and orientation features have explicit descriptions that make distinctions Stokoe's system does not. For instance, the signs CONGRESS and CHRIST differ in the final location (ipsi shoulder for CONGRESS, ipsi lower stomach for CHRIST). Stokoe's system describes both locations as on the torso.
4. The Liddell and Johnson system describes thumb configurations separately from finger configurations. This is a contrastive feature of some signs, such as LATER and TWENTY. What sets this notation system apart is its ability to provide a clear and precise way to describe the differences in any sign.

Supplemental Reading

"American Sign Language: The Phonological Base," by Scott K. Liddell and Robert E. Johnson (1989); pp. 292–331

References

Liddell, S. K., and Johnson, R. E. 1989. American Sign Language: The phonological base. *Sign Language Studies* 64:195–277.

Johnson, R. E., and Liddell, S. K. 2004. Aspects of American Sign Language phonology. Department of Linguistics, Gallaudet University. Typescript.

——. 2011a. A segmental framework for representing signs phonetically. *Sign Language Studies* 11: 408–463.

——. 2011b. Toward a phonetic representation of signs, I: Sequentiality and contrast. *Sign Language Studies* 11: 241–274.

Homework Assignment 4

1. Identify the segments in the following signs.

Example: WEEK X M H

a. FALSE
b. ALWAYS
c. EAT
d. COLOR
e. PAPER
f. SIT
g. CHAIR
h. CAN'T
i. INTERESTING
j. GOOD
k. HELP
l. BROKE (no money)
m. PREACH
n. WEAK
o. ARRIVE
p. BRING
q. WRITE
r. KING
s. WHERE
t. BLACK

2. Transcribe the following five signs using the Liddell and Johnson model and the Stokoe system. Compare your transcriptions. If possible, consult the *Dictionary of American Sign Language* directly for Stokoe's transcription of these signs.

Example: WEEK

Stokoe: $B_{a}\ G_{D^{\geq}_{\times}}$

Liddell and Johnson

WEEK

			Unit 1	Unit 2	Unit 3
	Timing Unit		X	M	H
	Contour				
	Contact		+	+	+
	Local Movement				
Strong Hand	Handshape		1		1
	Placement (Location)	focal site	Base of palm of weak hand		Fingertips of weak hand
	Rotation (Orientation)		Palm facing down		Palm facing down
	Nonmanual signal				
Weak Hand	Handshape		B		B
	Placement (Location)	focal site	In front of torso		In front of torso
	Rotation (Orientation)		Palm facing upward		Palm facing upward
	Nonmanual signal		—		—

a. UNDERSTAND

b. BLACK

c. DEAF

d. SIT

e. CHAIR

UNIT 7

Phonological Processes

Now that we have talked about the parts of signs and how they are organized, we can talk about ways in which sign structure may vary. The parts of signs may occur in different orders, and the parts of signs may influence each other. These variations are due to phonological processes (that is, the ways in which the parts of signs interact with each other). In this unit, we discuss five of them: movement epenthesis, hold reduction, metathesis, assimilation, and weak hand deletion.*

Movement Epenthesis

Signs occur in sequence, which means that the segments that make up signs occur in sequence. Sometimes a movement segment is added between the last segment of one sign and the first segment of the next sign. This process of adding a movement segment is called *movement epenthesis*. It is illustrated in the sequence of signs FATHER STUDY (see Figure 21). The basic form of both signs is a hold with internal movement, as follows:

FATHER	STUDY
	(right hand)
H	H

When the two signs occur in sequence, a movement is inserted between the two holds, so that the sequence looks like this:

FATHER		STUDY
H	M	H

We will return to movement epenthesis when we discuss fingerspelling.

* This discussion is based on the work of Liddell and Johnson (1989) and Lucas et al. (2001).

Figure 21. An example of movement epenthesis.

HOLD REDUCTION

Movement epenthesis is related to another phonological process called *hold reduction*. Hold reduction shortens holds between movements when signs occur in sequence. For example, the sign GOOD is composed of a hold, a movement, and a hold. The sign IDEA is composed of a shortened hold (X), a movement, and a hold. When the two signs occur in sequence, the last hold of GOOD and the first hold of IDEA become shortened holds (see Figure 22). The whole process would look as follows:

Basic sign:	GOOD				IDEA		
	H	M	H		X	M	H
Movement epenthesis:	H	M	H	M	X	M	H
Hold reduction:	H	M	X	M	X	M	H

This is a fairly common process in ASL, and we will return to it when we talk about compounds.

METATHESIS

Sometimes parts of the segments of a sign can change places. This process of changing place is called *metathesis*. To illustrate metathesis, look at the basic structure of the sign DEAF:

	DEAF						
	X	M	X	M	X	M	H
Handshape	1		1		1		1
Location	ant cheek		at cheek		ant jaw		at jaw
Orientation	palm out		palm out		palm out		palm out

Note: The abbreviation *ant* means "just in front of."

However, the location feature of the first and last segment might be reversed (see Figure 23). In that case, DEAF would look like this:

DEAF

	X	M	X	M	X	M	H
Handshape	1		1		1		1
Location	ant jaw		at jaw		ant cheek		at cheek
Orientation	palm out		palm out		palm out		palm out

Many signs allow segments to change place, including CONGRESS, FLOWER, RESTAURANT, HONEYMOON, NAVY, TWINS, BACHELOR, PARENTS, HOME, and HEAD. Other signs do not allow the location feature of segments to change place, such as BODY,

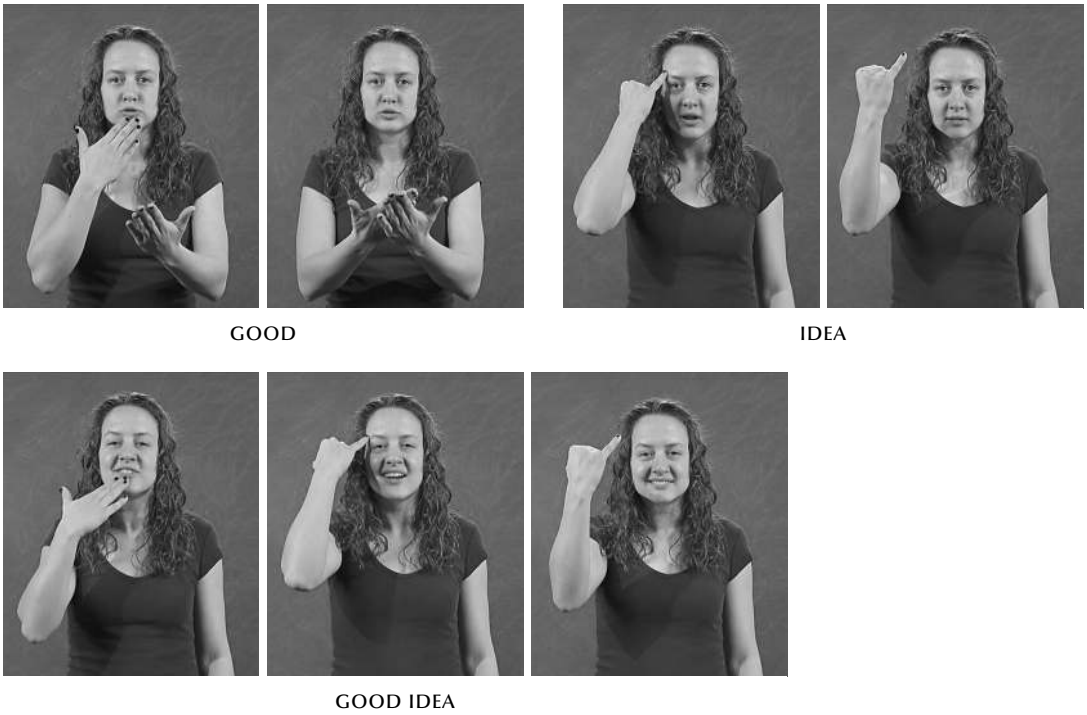


Figure 22. An example of hold reduction.

Figure 23. An example of metathesis.

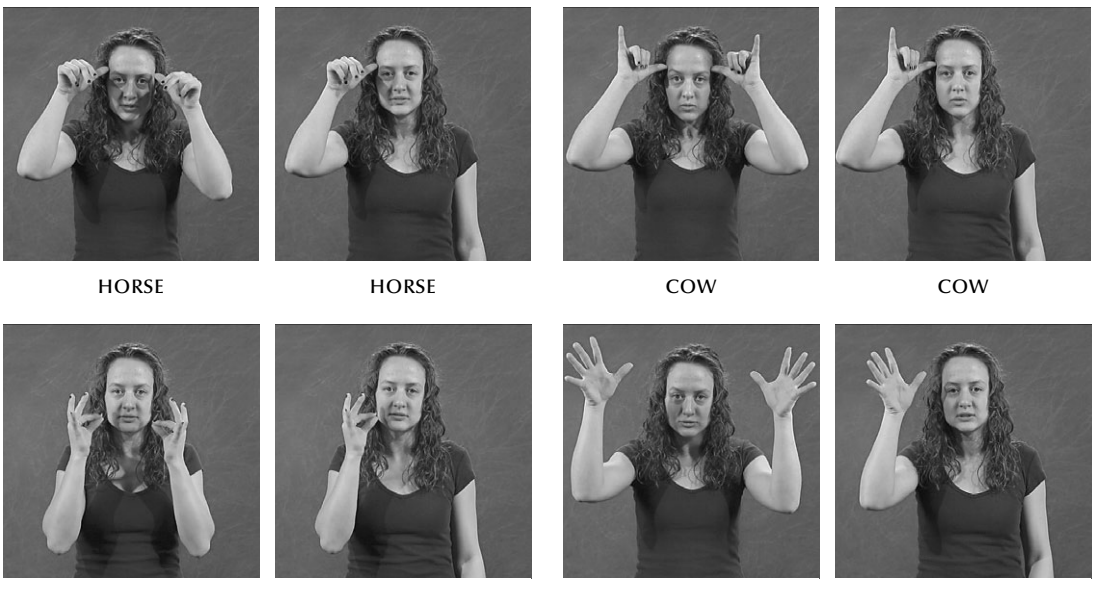
BROTHER dv:GET-OFF-SNOWMOBILE PRO-1 dv:GET-OFF-SNOWMOBILE

Figure 24. An example of assimilation.

KING, CHRIST, INDIAN, BLOUSE, THANKSGIVING, CHILDREN, and THING. In unit 23 we will talk about variation and what motivates signs like DEAF to exhibit variation.

Assimilation

Assimilation means that a segment takes on the characteristics of another segment near it, usually the one just before it or after it. A good example of this is the handshape in the sign PRO-1 (1st person, "I"). The basic handshape is a 1, but when the sign occurs in a sequence, very often the handshape changes to match the handshape of another sign in the sequence. For example, in Figure 24, when the signer produces the sequence BROTHER dv:GET-OFF-SNOWMOBILE PRO-1 dv:GET-OFF-SNOWMOBILE, the handshape of PRO-1 changes from 1 to Bent V because of the



HORSE HORSE COW COW

CAT CAT DEER DEER

Figure 25. Weak hand deletion.

handshape of GET-OFF-SNOWMOBILE. Similarly, when signers produce the sequence PRO-1 KNOW, very often the 1 handshape of PRO-1 becomes the Bent B handshape of KNOW. We will talk about assimilation more when we talk about compounds in unit 11.

Weak Hand Deletion

Sometimes the weak or passive hand is deleted from two-handed signs. This is more likely to occur when both hands perform an identical action. In some cases, deletion has resulted in historical changes, as in HORSE, COW, CAT, and DEER (see Figure 25).

Supplemental Reading

"Variation: Basic Concepts," by Ceil Lucas, Robert Bayley, and Clayton Valli (2003); pp. 512–515

References

Liddell, S. K., and R. E. Johnson. 1989. American Sign Language: The phonological base. *Sign Language Studies* 64:195–277.

Lucas, C., Bayley, R., and Valli, C. 2001. *Sociolinguistic variation in American Sign Language*. Washington, DC: Gallaudet University Press.

Homework Assignment 5

1. Watch "The Snowmobile" on the DVD. Find two examples of assimilation. For each example, write down the glosses and the Movement–Hold notation for both signs. Describe where the assimilation occurs and identify whether it is handshape assimilation, location assimilation, orientation assimilation, etc.

2. Find one example of weak hand lowering or weak hand deletion in "The Snowmobile." Write down the gloss, a description of what the citation form would be, and an explanation of the weak hand lowering or deletion that occurred.

UNIT 8

Summary

Here is a summary of the material that has been covered on ASL phonology. The key points to remember are as follows:

1. Like the symbols of spoken languages, the symbols of sign languages have parts.
2. The study of the smallest contrastive parts of a language is called phonology.
3. Before Stokoe's analysis, signs were thought to be unanalyzable wholes.
4. Stokoe's model makes the claim that signs are composed of three simultaneously produced parameters—the location, the handshape, and the movement. Stokoe demonstrated simultaneous but not sequential contrast.
5. Liddell and Johnson's model makes the claim that signs are composed of sequentially produced movements and holds. The handshape, location, orientation, and nonmanual information is contained in bundles of articulatory features. Sequential contrast can be demonstrated.
6. The Movement–Hold Model allows for the level of detail needed for the adequate description of sign structure and of sign processes in ASL.
7. The Movement–Hold Model demonstrates that the fundamental structure of sign languages is parallel to the fundamental structure of spoken languages. Stokoe stated that the structure of sign language is fundamentally different from the structure of spoken languages. He supported this theory with his claim that the parameters are simultaneously produced.
8. There are phonological processes in ASL that may influence how the parts of signs are produced or the order in which the parts are produced.

Perspectives on the Structure of Signs

1. Before Stokoe, signs were thought of as unanalyzable wholes.

   Stokoe (1960; 1965) described and analyzed signs. From his research, he concluded that signs have parts; signs have three parameters—handshape, movement, and location. (Orientation was added to the system later.) According to Stokoe, sign morphemes are different from the morphemes and words of spoken languages because they are seen as simultaneously, not sequentially produced.

Liddell and Johnson (1982 to the present) agreed with Stokoe that signs have parts, but they disagreed on the number of parts. Liddell and Johnson found that signs have five parameters—handshape, movement, location, orientation, and nonmanual signals.

2. Signs can be segmented into movements and holds.

Liddell and Johnson also found sign language phonology parallels spoken language phonology. Both spoken languages and sign languages divide the segments that make up the words or signs into two major types of units:

a. Consonants and vowels in spoken languages.
b. Holds and movements in sign languages.

A final key point to remember is that descriptions of the structure and use of sign languages and claims about how the phonology works are based on empirical observation and the formation of hypotheses that may end up being erroneous. This is true for the description of all parts of the language, not just phonology. If we discover that a hypothesis is wrong, we revise it based on our research findings. That is what the scientific method is all about: testing hypotheses using empirical data and revising the hypotheses if necessary.