A Comparison of Chinese and American Signs

6 Studies from the previous chapter have shown that the formational components of ASL signs are independently extractable and can be recombined into sign forms which are not actual ASL signs, yet follow the same structural rules. To this extent, ASL exhibits the duality of patterning characteristic of all languages.

But ASL may be very different from spoken languages in other respects. For instance, another fundamental aspect of language, according to linguistic theory—based, of course, on studies of speech—is that any particular language is tightly constrained (1) to a selected subset of all physically possible formational units and (2) by a set of rules for their combination. So far, it is not known whether such constraints are a result of the language mode—vocal articulation and auditory perception—or whether they are characteristic of language qua language.

The first constraint is true for every spoken language. In any one language, the phonemic segments that differentiate its words are represented by only a relatively small subset of all the speech sounds that occur in the world's languages.[1] Entire classes of sounds may be used in one language and not another: ingressive sounds and clicks occur in some African and Asian languages but not at all in English. German has a /pf/ sound, a word-initial /ts/ sound, and a voiceless fricative /x/, which do not occur in English. English has dentals, /θ/ in *thin, thigh,* and /ð/ in *they, thy,* which do not occur in German or French.

Even when sounds of two languages are comparable, the target pronunciations of the sounds may differ in phonetic detail. In French and Spanish the sounds /t/, /d/, and /n/ are made with the tongue tip contacting the upper teeth, whereas the English /t/, /d/, and /n/ are made with the tongue against the gum region behind the teeth (the alveolar

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This chapter was written in collaboration with Patricia Siple.

ridge); the sounds in the two languages are consistently different in articulation.

A speech sound is the result of a number of simultaneous muscular adjustments; any small variation may affect the result. Adjustments made in producing the target sounds of a language are learned as habits very early in life and may be difficult to change later. It is often difficult even to hear any difference between sounds that count as the same phoneme in one's own language but represent distinct phonemes in another; when one is learning the new language, he may well pronounce the new sounds with old habits and thus fail to make important distinctions. Japanese has a single liquid sound, which lies between the English /l/ and /r/ sounds. Japanese speakers learning English may have difficulty in distinguishing and pronouncing the English /l/ and /r/. Such minute differences between the ways native and nonnative speakers pronounce a language contribute to what we experience as a foreign accent.

Under the second constraint each spoken language allows its particular sounds to be combined only in certain ways; not all possible combinations of sounds can be used to form morphemes. All languages observe such constraints but the combinatorial rules are not the same from one language to another, even when their sounds are similar. For example, although English and German have in common the sounds /ž/ (the final sound in *rouge*) and /s/, English does not permit /ž/ in initial position in words, whereas German does; and German does not permit an initial /s/, whereas morphemes beginning with /s/ are common in English (Delattre 1965). English does not use more than three consonants initially and such clusters are both few in number and highly restricted in combinatorial arrangements; in Russian, initial clusters of three and even four consonants (/tkn/, /vzdr/) are much more prevalent and much less restricted (O'Connor 1973).

Between spoken languages, then, there are systematic differences of two kinds: differences in the elements of which morphemes are composed and differences in the ways these elements can be combined. Thus the same sound combinations may be actual words (though with different meanings) in two spoken languages: the German word *weisz* ('white') is pronounced approximately like the English word *vice*. Or a sound combination that is an actual word in one language may be a possible, though not actual, word in another: *blick,* as in the German word meaning 'glance,' is not an English word, but it is a possible combination of sounds in English, a potential morpheme. Or a sound or sound combination that occurs in one language may be impossible in another: the German velar fricative in *Buch* ('book') does not occur in English; the initial consonant cluster of the German word *Knabe* ('boy')

is also excluded from English. Such impossible (disallowed) sounds and combinations provide evidence for morpheme structure constraints specific to a particular language.

Linguists have formulated phonological rules to characterize the regularities that speakers implicitly know. These rules specify which phonetic sequences are possible morphemes in a language and which are excluded—for example, that /strib/ is a possible morpheme in English, lawful according to phonological rules, though /ftrib/ and /zdrall/ are outside of the system of English word formation.

Thus according to linguistic theory spoken languages are so organized and structured as to exclude certain sequences of sounds in forming the words of a language; but do native speakers have intuitions that match these regularities? Can native speakers of English distinguish between a possible morpheme in their language and one that is excluded? Brown and Hildum (1956) compared the ability of English speakers to identify syllables having unlawful initial consonant clusters, such as /tlib/, with their ability to identify possible combinations that are not actual words, such as /strab/, under conditions of superimposed noise. The possible morphemes were identified with much greater accuracy than excluded ones. Greenberg and Jenkins (1964) presented morphemes ranging from actual sequences, such as /stick/, to excluded sequences, such as /zyik/. Then English speakers were asked to rate the words in terms of their distance from English words; their ratings accorded with predictions made from phonological rules of English. Such experiments have demonstrated that speakers' intuitions are in accord with phonological rules that specify possible (including actual) morphemes in a particular language and exclude impossible ones.

There is no reason to assume a priori that these properties of spoken languages would also characterize visual-gestural languages. ASL differs significantly from spoken languages in that its lexical units are not analyzable as linear sequences of segments. Perhaps, too, these constraints are peculiar to spoken language because they derive from restrictions on its modes of articulation and perception; a language based on movements of the hands in space may have quite different characteristics and be far less constrained in structure than a language articulated by the vocal apparatus.

We have seen some evidence that ASL morphemes are internally constrained. Studies of slips of the hand, for instance, yielded a large set of errors that had the form of possible signs, sign forms that carried no meaning (were not actual lexical items) but were possible ASL forms in the eyes of native signers (see chapter 5). This suggests the internalization of a system beyond actual lexical items. But is the for-

mational system of ASL signs so tightly structured as to exclude certain gestures that are nonetheless physically possible? Are only certain values and certain combinations of values allowable in the system? If so, is that system specific to ASL?

It could well be that the values assumed by hand configurations in ASL represent, for instance, the entire set of configurations that hands can easily and comfortably assume; or that the values assumed by places of articulation represent, say, the easily discriminable locations on the head and torso that might be used in any sign language; or that the components of movement represent the set of easily produced and easily distinguished motions made by the hands.[2] If this were the case, we might expect to find that the values of handshapes, locations, and movements would be the same across all sign languages. Thus there would be no differences from one sign language to the next. All sign languages might assume the same set of values, dependent only on distinctive (and easily distinguishable) shapes, places, and movements. But if all sign languages were to share the same constraints on form, this would make them very different from spoken languages.

A Corpus for Comparison

One way to explore the extent of internal constraints of ASL is by comparing it with another sign language to see whether there are structural differences that might distinguish the signs of the two languages. First, is it possible, on the basis of analysis and the intuitions of deaf signers, to identify gestures in another sign language which are excluded as ASL sign forms? Second, presented with sign forms not occurring in their own language, can naive untutored deaf signers make judgments that would separate those that are possible forms in their language from those that are impossible forms?

For some time we observed signers of other sign languages, watching for sign parameter values or combinations of values that seemed alien to ASL. But it was not until we observed Chinese deaf signers that we discovered gestures in another sign language which seemed very different from ASL signs. Not only did Chinese Sign Language (CSL) impress us overall as somehow more stiff and angular than ASL —a point we shall return to—but some Chinese signs seemed clearly extrasystemic to ASL. Study of a handbook of some 2000 CSL signs (Goodstadt 1972) and observation of videotapes of several deaf native Chinese signers recently arrived in the United States led us to define more precisely some constraints on form within ASL.[3] For example, some Chinese signs use a handshape common in ASL (/F/) but use it with a contacting region never occurring with that handshape in ASL

signs (the extended fingers). Not until we observed CSL signs did we identify this as a disallowed contacting region for that handshape in ASL.

After considerable study and with the aid of deaf Chinese signers we selected some representative Chinese signs that bore particular relations of form to ASL signs. Using the impressions and intuitions of deaf American signers along with our own general sense of what constituted differences, we categorized these signs and selected ten representative instances in each of three categories. *Category A* includes CSL signs that closely approximate the form of actual ASL signs, although they have different meanings in CSL. *Category P* includes CSL signs that have the form of possible signs of ASL but are not themselves actual lexical items in ASL; these sign forms exhibit handshape, location, and movement values that occur in ASL signs, and they combine these values in ways judged possible to ASL. *Category P* signs (like most of the slips of the hand discussed in chapter 5) could thus be considered lexical gaps in ASL. Finally, *Category I* includes CSL signs whose forms are seemingly impossible as ASL signs—that is, forms that seem to use parameter values or combinations outside of the system of signs with which we and our deaf informants are familiar. In settling on ten signs for each category, we chose signs judged as prototypical instances, clear cases representative of many others that had been examined.

Chinese Signs, Category A: Actual ASL Sign Forms

Category A CSL signs are sufficiently similar in formation to ASL signs that American deaf signers perceive them as equivalent to actual signs of ASL.[4] For example, American deaf signers on viewing the CSL sign FATHER recognized that sign form as the ASL sign SECRET. Both the CSL FATHER and the ASL SECRET are made with a fist handshape, the thumb side contacting the chin with a repeated touch (see figure 6.1a). (The ASL sign FATHER has an entirely unrelated form: a palm-open spread hand contacting the forehead.)

In like manner the form of the CSL sign EXPLAIN closely resembles the ASL sign COOK: both are made with two palm-open nonspread hands, one hand contacting the other, palm down, then turning and contacting again with the back of the hand (see figure 6.1b). The CSL sign WEEK closely resembles the ASL sign FALSE; both are made with an index hand brushing sideways along the mouth (see figure 6.1c). (The ASL signs EXPLAIN and WEEK are formationally unrelated to the CSL signs.)

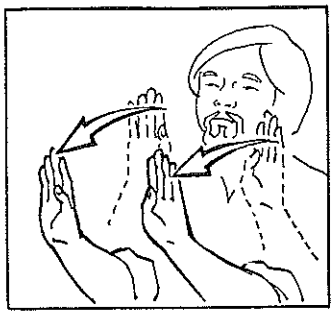
The pairs of signs that are apparently similar in formation are presented in figure 6.1 and in the list that follows it.

Figure 6.1 Examples of Category A CSL signs: Chinese signs that are also ASL sign forms.

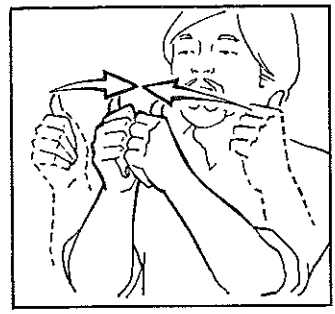
(a) CSL FATHER: like ASL SECRET

(b) CSL EXPLAIN: like ASL COOK

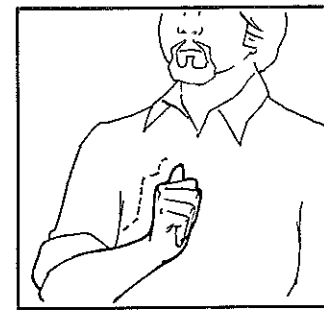
(c) CSL WEEK: like ASL FALSE



(d) CSL HELP: like ASL PUSH



(e) CSL FRIEND: like ASL WITH



(f) CSL TEACHER: like ASL MYSELF

Category A. CSL signs that resemble ASL sign forms

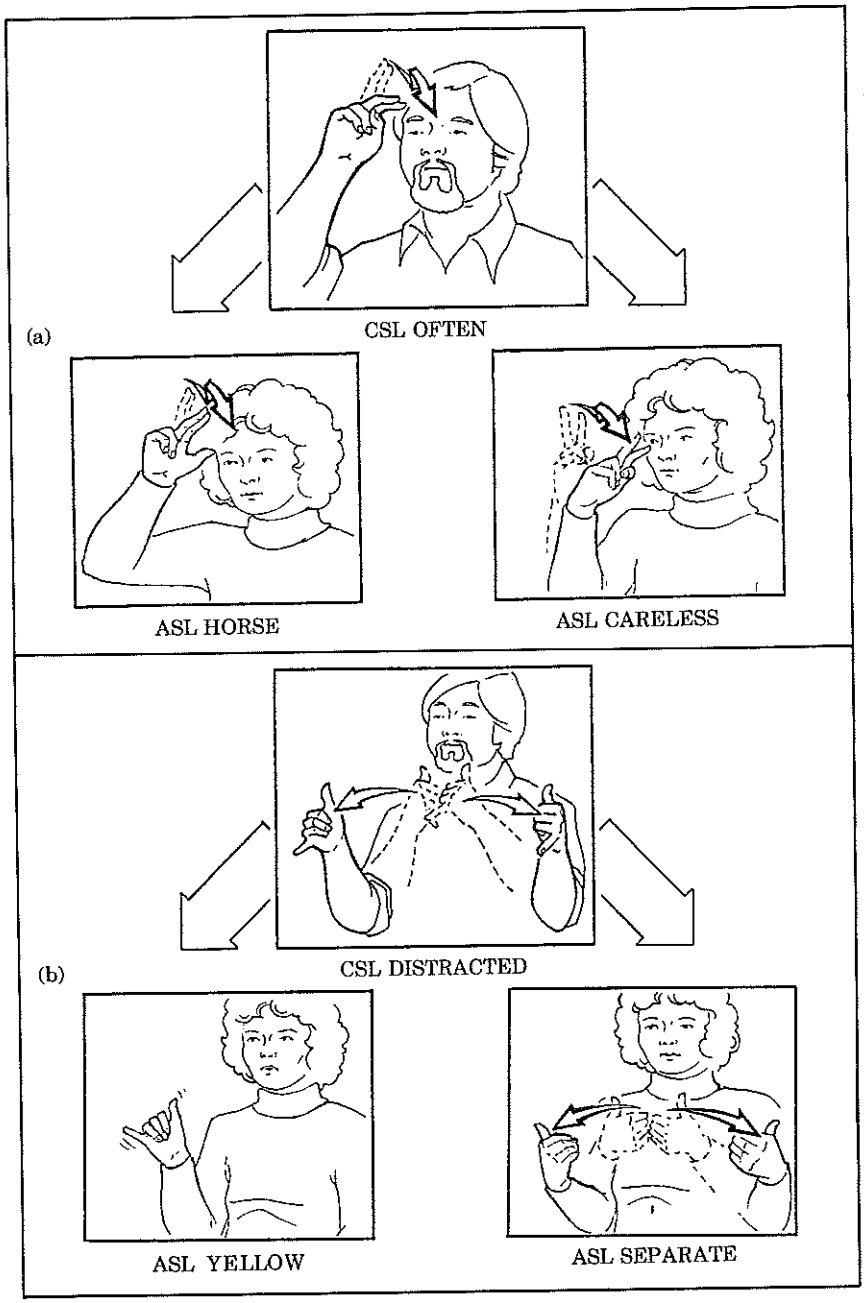
CSL sign	*Equivalent ASL sign form*	*CSL sign*	*Equivalent ASL sign form*
FATHER	SECRET	TEACHER	MYSELF
EXPLAIN	COOK	FLOAT	MAYBE
WEEK	FALSE	OPPOSITE	DIE
HELP	PUSH	TEASE	BACHELOR
FRIEND	WITH	FALSE	DIRTY

Chinese Signs, Category P: Possible ASL Sign Forms

Category P signs were judged possible ASL sign forms but are not actual lexical items in ASL. They are composed of formational values (handshapes, locations, movements) that are highly similar in the two languages. These values are combined in ways judged to be possible to ASL signs but the combinations happen not to have conventional meanings associated with them; thus they count as possible ASL sign forms.

The form of the CSL sign OFTEN is not like any conventional ASL lexical item, but it is a potential ASL sign: the handshape is like that

Figure 6.2 Examples of Category P CSL signs and the ASL signs with which they share formational components.



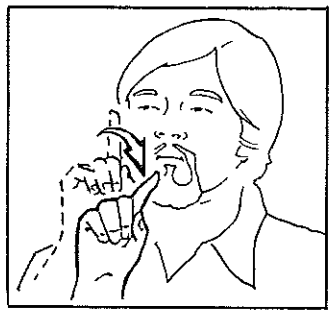
of the ASL sign HORSE, the location and motion resemble those of the ASL sign CARELESS (see figure 6.2a). The form of the CSL sign DISTRACTED resembles no existing ASL lexical item; however, formational elements of the CSL sign are like those of some ASL signs: a handshape as in the ASL sign YELLOW, a location and motion as in the ASL sign SEPARATE (see figure 6.2b).

Lexical items in Chinese Sign Language that seem possible sign forms in ASL yet are not actual ASL lexical items are shown in the following list and in figure 6.3.

Category P. CSL signs that are possible but nonoccurring ASL sign forms

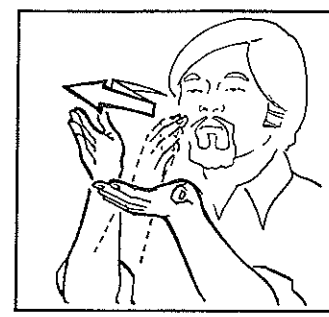
DISTRACTED	MISJUDGE
OFTEN	ARGUE
EMBARRASSED	HUMBLE
DISCOURAGED	PROSTITUTE
EXPERIENCED	REASON

Figure 6.3 Examples of Category P CSL signs: Chinese signs that are possible but nonoccurring ASL sign forms.

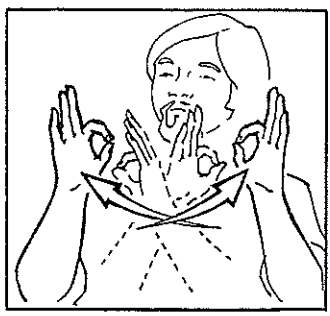


(a) CSL EMBARRASSED

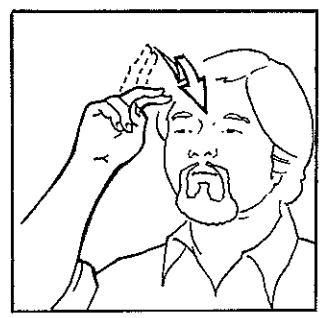
(b) CSL DISCOURAGED



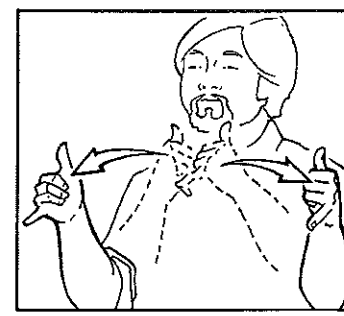
(c) CSL EXPERIENCED



(d) CSL MISJUDGE



(e) CSL OFTEN



(f) CSL DISTRACTED

Chinese Signs, Category I: Impossible ASL Sign Forms

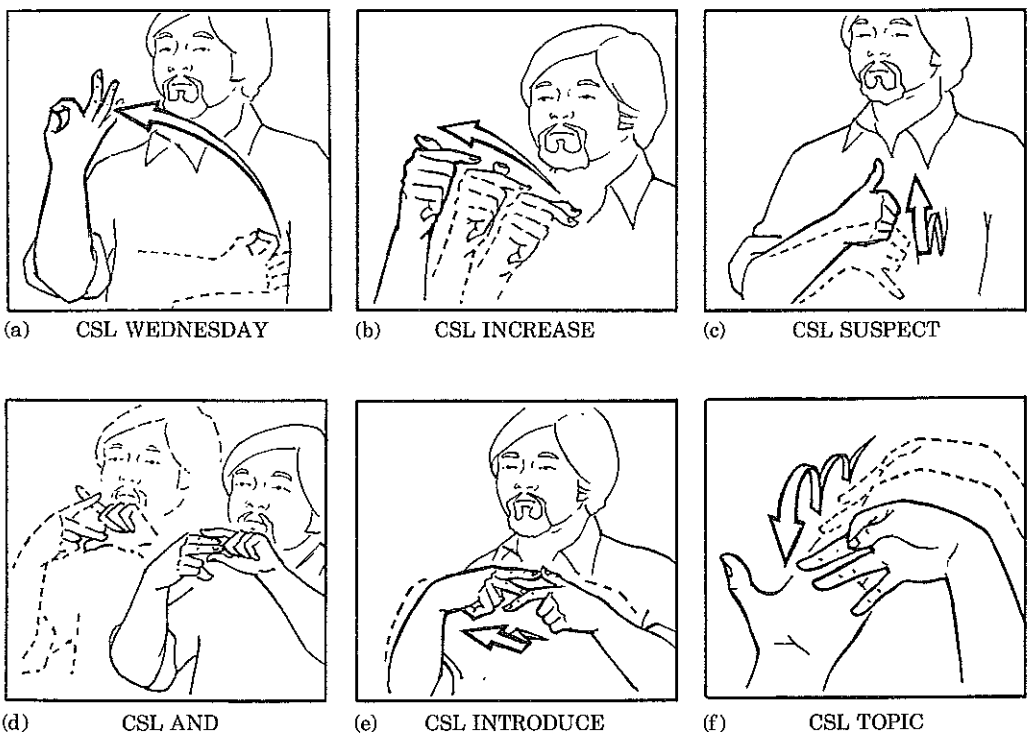
Category I signs are Chinese signs that we and deaf signers judged to be extrasystemic, or excluded as ASL sign forms. These CSL signs seem very different in formation from ASL signs. The particular signs chosen were not isolated idiosyncratic instances of CSL sign forms but were representative of others found in Chinese Sign Language.

The CSL signs chosen for Category I are shown in the following list and in figure 6.4.

Category I. CSL signs that seem impossible as ASL sign forms

WEDNESDAY	TOPIC
INCREASE	SECOND-MARRIAGE
SUSPECT	OLDER-BROTHER
AND	CONTROL
INTRODUCE	HEADMASTER

Figure 6.4 Examples of Category I CSL signs: Chinese signs that seem impossible as ASL sign forms.



(a) CSL WEDNESDAY (b) CSL INCREASE (c) CSL SUSPECT

(d) CSL AND (e) CSL INTRODUCE (f) CSL TOPIC

Some CSL signs use formational values that never occur in ASL. For example, the CSL sign WEDNESDAY (like CSL signs for the other days of the week) begins in a location not used in ASL lexical signs. The CSL sign INCREASE has a local movement that occurs frequently in CSL signs but not at all in ASL signs (figure 6.4b). The CSL sign SUSPECT also has a movement that does not occur in ASL signs.

Other excluded CSL sign forms are composed of prime values occurring in ASL signs but the values are, according to the intuitions of deaf consultants, combined in ways that are disallowed. For instance, we found handshapes that occur in both sign languages but with different permissible contacting regions. For the CSL sign INTRODUCE, one hand is in a /V/ shape, as in ASL READ and LOOK-AT; the other hand is in an /L/ shape, as in ASL ANT and SHOOT. But the way in which the fingers of the /V/ hand contact the /L/ hand is excluded in ASL signs (figure 6.4e).

Many ASL signs have an /F/ HC (index fingertip and thumb tip touching, other fingers raised), for instance, VOTE, INTERPRET, COUNT, JOIN, INDIAN, PREACH, COOPERATE, IMPORTANT, and FAMILY. In these ASL signs, it is the thumb and index finger (the pinching fingers) of the handshape, never the other three fingers, that make contact, join, grasp, lead; they are in fact the contacting region or focus of the HC (see figure 6.5). In Chinese Sign Language the same handshape occurs, but is used in very different ways. In some Chinese signs like GIVEN-NAME, SURNAME, TOPIC, GOOD-REPUTATION, CHOP, ENROLL, MENU, QUESTION, and SUMMARY, the three extended fingers of a pinching handshape are the prominent part of the sign, either as the contacting region of the handshape or as a base hand (see figure 6.6).

Our corpus consisted, then, of three ten-item categories of Chinese signs chosen so that they represented actual, possible, and impossible ASL forms.

Testing the Categories

To date, so little is known about any sign language that the categories could not, of course, be constructed on the basis of a completed phonetic analysis or on clearly defined phonological rules. To test our observations and intuitions of apparent constraints on the form of signs, we turned to naive deaf signers for judgments about the nonoccurring sign forms (the Chinese signs) which might differentiate between those that are possible ASL sign forms and those that are excluded from ASL. Rather than making such judgments directly, subjects were asked to observe the Chinese signs in pairs (some selected from within categories, some from across categories) and to

Figure 6.5 The pinching Hand Configuration in ASL signs. (Note thumb- and index-finger focus.)

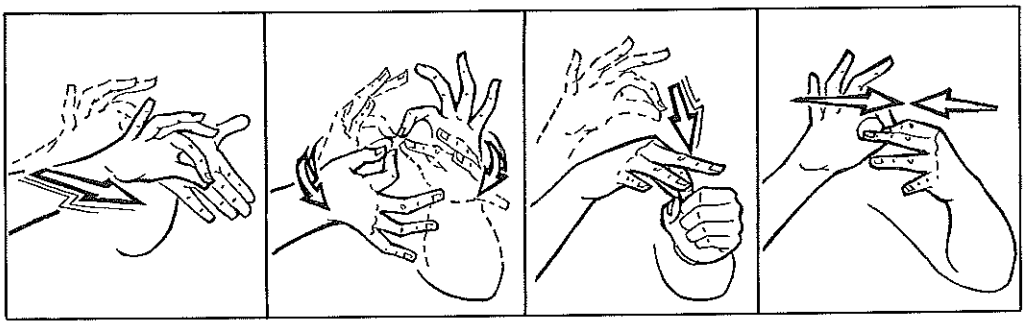
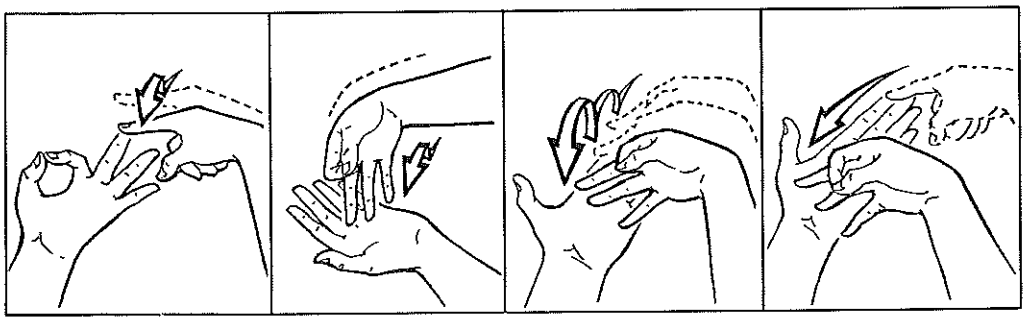


Figure 6.6 The pinching handshape in some CSL signs. (Note middle-, ring-, and little-finger focus.)



judge, for each pair of signs, which was more like a sign of ASL. If subjects selected P signs more often than I signs, that would suggest that our analysis was on the right track and that ASL formational structure is sufficiently constrained that certain gestures occurring in another sign language are preferred over others as ASL-like forms.

From the 30 signs we constructed 180 pairs of signs. Equal numbers of the following kinds of pairs were constructed from signs of the three categories:

A	A	P	A	I	A
A	P	P	P	I	P
A	I	P	I	I	I

The 180 pairs were randomized and recorded on videotape as two sets of 90 pairs. As the listing shows, some pairs are signs within a category, some are from different categories. Each sign occurred equally

often as the first ar . the second item of a pair. Each occurrence of a sign as a stimulus was edited from the same original rendition produced by a deaf Chinese native signer.

Eight high school students from the Maryland School for the Deaf served as subjects in this experiment.[5] All were prelingually deaf and had deaf parents; thus all had learned ASL as a primary native language. None had previously seen Chinese signs.

To familiarize subjects with the set of items they would be rating, we showed them the 30 Chinese signs, each presented twice, in random order. They were instructed to watch the form of the signs; they were not, of course, told the meaning of any of the signs until after the experiment was completed. The instructions were presented in written form and also signed on videotape by a deaf signer. Subjects were told that they would see pairs of signs selected from the signs presented in the warm-up. To clarify the procedures, subjects were shown pairs of items not on the test: some were actual ASL signs; some were possible ASL signs; and some were gestures invented by our deaf associates as impossible signs of ASL. For each pair, subjects were instructed to decide which of the two gestures was more like a sign of American Sign Language.

Answer sheets consisted of numbered items with two columns of blanks, for first position and second position. Subjects were asked to check either column 1 or 2 on their response sheets, corresponding to whether they judged the first or the second item presented to be more like a sign of ASL. They were told not to leave any items blank and to guess if they were not sure.

The pairs of Chinese signs were presented on videotape with two seconds between the two items; seven seconds elapsed between pairs, during which time subjects recorded their responses.

The Categories Confirmed

There are many ways in which this experiment could have failed to produce any kind of result. We did not know how naive subjects might interpret the instructions to judge which of a pair was more like an ASL sign. They had learned ASL as a native language but had certainly been exposed to some form of signed English, the forms of which are different from ASL forms, and they were adept at freely interspersing ASL and mime. They could have made judgments with respect to any and all of three gesture forms: ASL signs, English-based signs, or nonsign gestures. Further, the task required remembering two different signs and their order, and making a comparative judgment on the basis of those remembered forms.

Overall, the eight subjects were highly consistent in their judg-

ments. A chi-square test of symmetry was performed on the data for each subject, to investigate whether that subject was consistent in choosing a particular kind of item regardless of its position as the first or the second item of a pair; the eight subjects each produced very consistent preferences (χ^2 (3) = 3.57, $p > 0.30$). Because each sign appeared equally often as a first and second item, we could test also for position preference; we found no significant difference associated with whether an item occurred in first or second position.

Furthermore we compared results from the first half and from the second half of the test and found that the agreement was quite good. A chi-square test (χ^2 (8) = 1.55, $p > 0.99$) indicated that the data could be pooled.

There should be no distinct preference for either member of a sign pair in the comparison of two A sign forms, two P sign forms, or two I sign forms. Between Chinese signs classified within a category, preferences were indeed random.

However, if the intuitions of naive deaf subjects matched the conclusions of our own analysis, we should find clear preferences for items *across* categories. This expectation was dramatically borne out. The A signs were chosen over P signs in 85.9 percent of the cases and over I signs in 99.1 percent of the cases. Most important for the concerns of this study was the result when deaf subjects were comparing P signs (possible forms) with I signs (impossible forms): subjects strongly preferred the P signs, choosing them over the I signs 82.1 percent of the time. Although neither of the forms presented in such a pair occurs as a sign of ASL, Chinese sign forms classified as possible ASL signs seemed clearly "more like ASL signs" than Chinese sign forms classified as impossible in ASL.

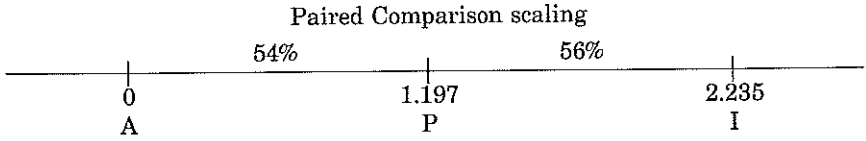
Preference for first over second item in Chinese sign pairs

Category of first item	Category of second item		
	A	P	I
A	41.2%	84.4%	98.8%
P	12.5%	53.5%	83.1%
I	0.6%	18.9%	54.4%

Thus the judgments of the naive ASL signers support the view that ASL signs conform to a set of formational rules that not only exclude certain gestures occurring as actual signs in another sign language, but that also differentiate these extrasystemic gestures from nonoccurring but potential ASL sign forms.

In addition to the fact that the Chinese signs originally selected as possible and impossible sign forms of ASL were so differentiated by the

naive deaf subjects, paired comparison scaling of the data revealed that subjects dealt with the 30 signs as if they fell into three distinct categories, these categories mirroring those that had been defined analytically. The interval scale shown below indicates that the distance between actual and impossible sign forms was almost equally divided between actual and possible signs and possible and impossible signs. A chi-square test of paired comparison (Mosteller 1951) showed good agreement between the data predicted by the obtained scale and the observed data (χ^2 (1) = .0013, $0.950 < p < 0.975$).



A Fist Is Not a Fist: Imitations of Foreign Signs

In addition to constraints on formational values and their combinations, spoken languages exhibit more subtle regular differences in the ways their sounds are produced. In the introduction we discussed briefly some of these detailed phonetic differences between spoken languages. For example, in French and Spanish /t/, /d/, and /n/ involve contact of the tip of the tongue against the teeth whereas in English these sounds are made with the tip of the tongue against the alveolar ridge. This minor difference may not be noticed or reproduced by a native English speaker learning French or a native Frenchman learning English. The sounds may be heard as roughly representative of the same sound, and it is not unusual for a native speaker of one language to continue to make those sounds in precisely the same way he has always made them even when pronouncing the second language.[6]

Although there would be no reason to expect that similar detailed formational regularities distinguish one sign language from another, our continuing work with the Chinese signs unexpectedly yielded evidence of some subtle differences in formation between Chinese and American signs that are seemingly alike. Our insights did not derive initially from our own direct observation of the Chinese signs, nor from observations by deaf researchers; rather, the new insights came from observing imitations of Chinese signs by hearing nonsigners. Both deaf signers and hearing nonsigners were asked to imitate the Chinese signs used in the categorization study (intermingled with ASL signs).[7] The imitations were produced twice and were videotaped using two cameras to provide two images, one of the overall sign and one of a close-up of the hands making the sign.

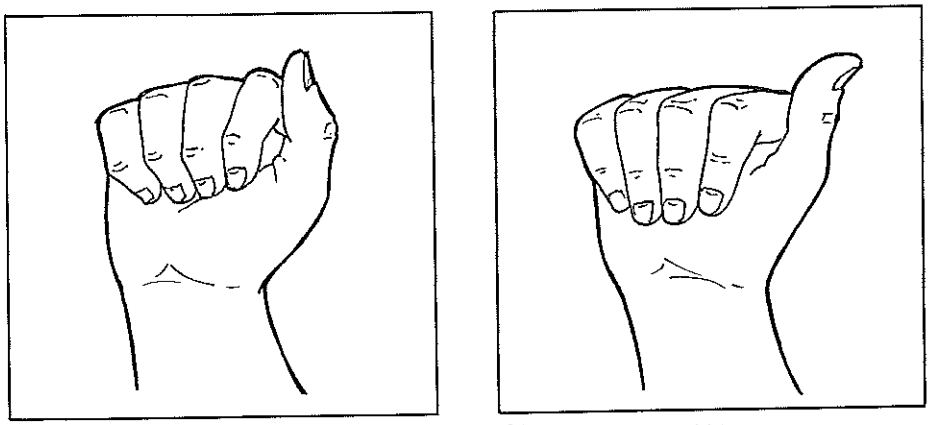
We have been claiming that each Chinese sign in Category A was

formed like an actual American sign with a different meaning. The Chinese sign FATHER, for instance, is like the ASL sign SECRET: both are made with a compact closed fist, the back of the thumb contacting the lower face (see figure 6.1a for Chinese sign). Many deaf ASL signers judged the two to be the same. When they were asked to copy the Chinese sign, they simply made the ASL sign SECRET and we hearing analysts agreed that these were equivalent sign forms.

Hearing nonsigners, however, had no advance notion about how to shape the hand for the Chinese sign FATHER or for the ASL sign SECRET (or for any other sign). Not knowing what aspects of the sign are critical nor what details might be peculiarities of a particular rendition or of the idiosyncratic shape of a signer's hand, hearing nonsigners tried to copy exactly what they saw. But certain peculiarities of the imitations they produced led us to reanalyze the formation of the Chinese and American signs; then we discovered some minute differences between CSL FATHER and ASL SECRET which we had overlooked. The two signs are made with a closed fist, one of the unmarked, most common handshapes of ASL. It is a very straightforward shape—no fingers spread apart or bent or crossed over one another—just a closed hand, with the thumb at the side of the index finger.

In a closer inspection of the videotaped Chinese sign FATHER used on the test, we noticed some fine distinctions that made us realize that a fist may *not* be just a fist. The Chinese sign FATHER was made with what seemed to be an odd closure. Whereas the ASL handshape in SECRET is relaxed, with fingers loosely curved as they close against the palm (figure 6.7a), in the CSL handshape in FATHER the fingers

Figure 6.7 The closed fist handshape in ASL and CSL. (Note differences in thumb placement and hand closure.)



(a) ASL (b) CSL

were folded over further onto the palm and were rigid, not curved (figure 6.7b). In the relaxed ASL handshape, the thumb contacts the index finger near the first joint, and only the tip of the thumb protrudes above the line of the closed index finger. In the more rigid shape made by the Chinese signer, the thumb rests at the midpoint of the first phalange and protrudes upward more prominently than in the ASL shape. Furthermore, the contacts for the two signs differ: in the ASL relaxed shape, contact is with the entire back of the thumb; in the CSL stiffer shape, contact is on the lower phalange at the major knuckle of the thumb.

We thought that the difference noted might be only a peculiarity of a single sign in a single rendition. But other signs of the chosen 30 made by one Chinese signer also have that handshape—namely, the Chinese signs FRIEND and TEACHER; when we examined them, we observed the same peculiarities. We also considered the possibility that the difference might be caused by something about that particular Chinese signer, perhaps the bone structure of his hand. But in tapes of the same signs made by five other Chinese deaf signers the observed differences from ASL occur consistently across signers. Thus the handshape and contacting region used in ASL for signs like SECRET, WITH, and MYSELF are approximately—but not precisely—the same fist handshape and contacting region used in CSL for signs like FATHER, FRIEND, and TEACHER. The Chinese signs are made with a stiffer handshape and use a consistently different contacting region. Apparently there are differences between the formation of Chinese and American signs at the level of "phonetic" detail.

Our study of hundreds of Chinese signs had revealed evidence of other regular differences between the two languages which now seemed clearly related to the "phonetic" difference observed. Certain CSL hand configurations not only do not occur in ASL signs, they seem somehow not the kind of configurations that belong in the set of ASL handshapes. In one, the hand is bent at the palmar plane and all the fingers are spread, rigid, and stiff; this handshape shares angularity and stiffness with the Chinese fist.[8]

When Chinese deaf people made signs on videotape, we asked them to follow the CSL sign with the translation-equivalent ASL sign if they knew it. In their renditions of ASL signs, characteristic differences often occurred. For example, the ASL sign BETTER starts with a flat hand closing to a fist as it moves; a Chinese deaf signer made the sign in general correctly, but closed to a Chinese fist rather than the softer ASL /A/.

Further study of such differences may lead to an understanding of formational differences between two sign languages.[9] It is possible that

differences in ways of forming handshapes reflect internal consistency among some of the primes of a sign language. Such differences could certainly contribute to the kind of general impression of language difference we first noticed in the stiffness and angularity of Chinese signs. Internal patterned relationships of this kind within sign languages would mean that individual sign languages are tightly constrained even at the level of "pronunciation" of formational elements.

The comparison of American with Chinese signs indicates that ASL signs indeed exhibit formational constraints specific to the language. Sign languages are constrained not merely by motor limitations on handshapes, locations, and movements, nor by general visual limitations, but also in ways that are far less predictable. Certain handshapes, locations, and movements occur in one sign language and not another. Two divergent sign languages may use the same parameter values (like a pinching handshape) and yet have different restrictions on how these values can combine in the signs of the two languages. Some parametric values (like the closed fist) are common to the two languages and yet show detailed but consistent differences from one language to the other (degree of closure, for instance).

Thus the specificity of language elements, the details of their form, and the rules for their combination are not artifacts of the speech mode. Such systematization of language occurs anew in languages produced by the hand and perceived by the eye.

In a discussion of spoken language Sapir (1921) vividly contrasted the comparative lack of freedom of voluntary speech movements with the all-but-perfect freedom of voluntary gesture: "Our rigidity in articulation is the price we have had to pay for easy mastery of a highly necessary symbolism. One cannot be both splendidly free in the random choice of movements and selective with deadly certainty." For a deaf signer, whose language is in his hands, the perfect freedom of voluntary gesture is apparently replaced by movements of the most intricate precision.