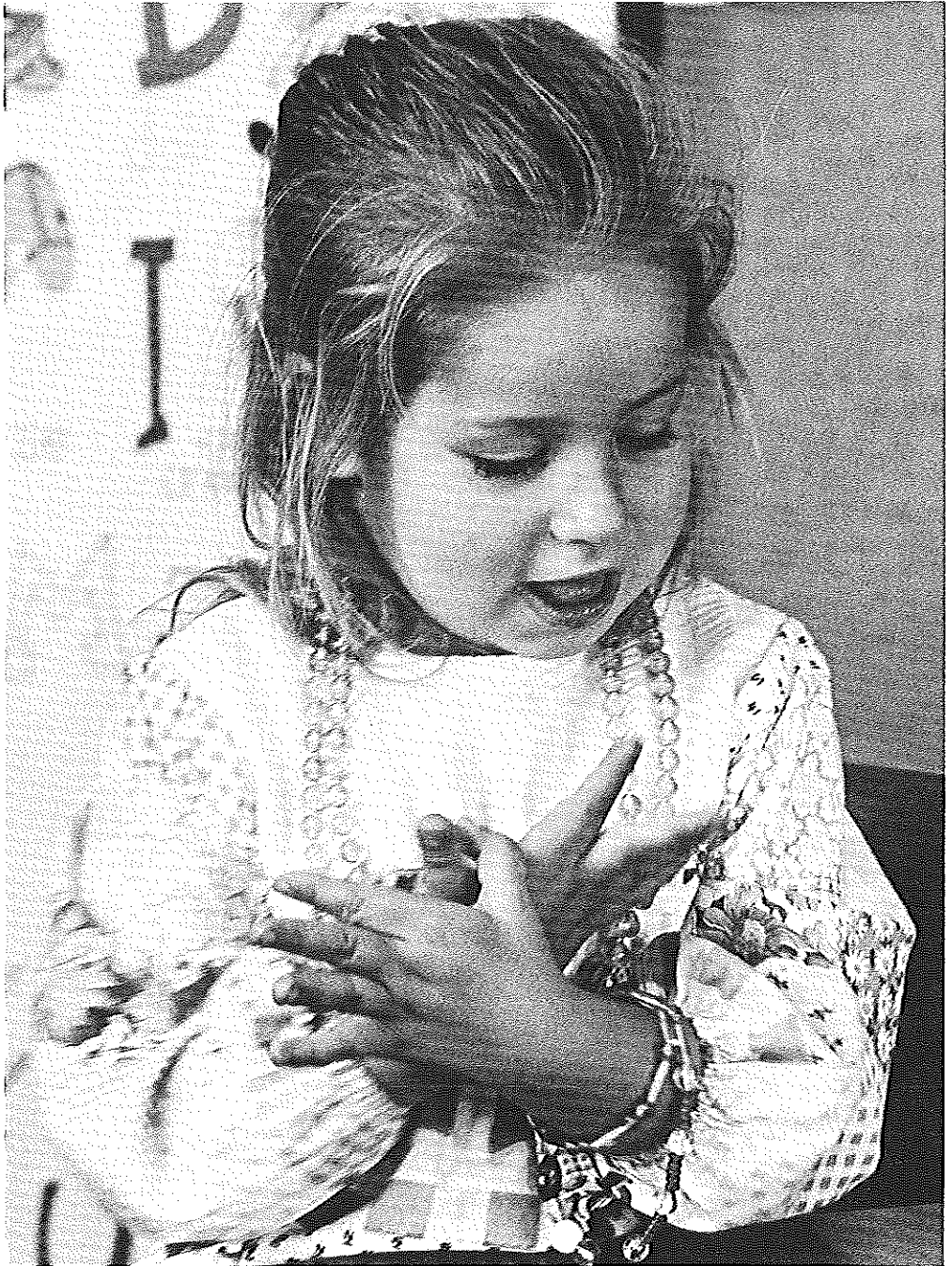


I. The Two Faces of Sign



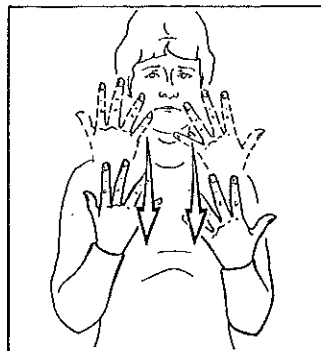
Iconicity in Signs and Signing

1 When a hearing person with no knowledge of sign language observes deaf signers in conversation, he sees rapidly moving hands forming shapes in space. Typically, he assumes that these movements are mimetic—expressive gestures or visual descriptions. Paradoxically, without the help of an interpreter he is very likely not able to guess even the topic of the conversation, much less the meaning of individual signs in the sign stream. Looking at ongoing conversational signing is little different in this respect from listening to a conversation in a spoken language one doesn't know.

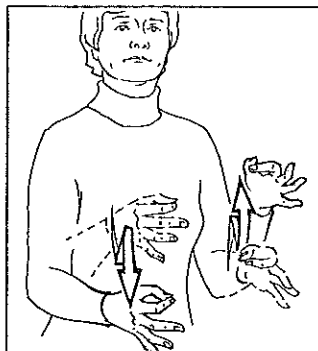
However, when the naive hearing person begins to play the language-learning game of elicitation—asking, for example, “What is the sign for tree?” or, pointing to a book, “What is the sign for that?”—his impression of the individual signs out of context will be very different from his impression of similarly elicited words of an unfamiliar spoken language. Listening to foreign words, a hearing person attends to their component sounds, associating them with the sound units—say, the p sounds or the o sounds—of his own language. He brings to them his own intuitions, however vague, about phonetic structure. For the trained linguist there is even an international phonetic alphabet available for making a first approximation to a phonetic transcription of the individual component sounds of words. But on viewing signs (particularly for objects that one can point to), the naive observer typically focuses on how their overall visual form is related to their meaning. The form of many a sign appears to be strikingly appropriate for what it designates.

Portions of chapter 1 appeared in U. Bellugi and E. S. Klima, “Two faces of sign: iconic and abstract,” in S. Harnad, ed., *Origins and evolution of language and speech* (New York: New York Academy of Sciences, 1976), pp. 514–538.

Figure 1.1 Examples of ASL lexical signs with suggestions of the ideas behind the signs.



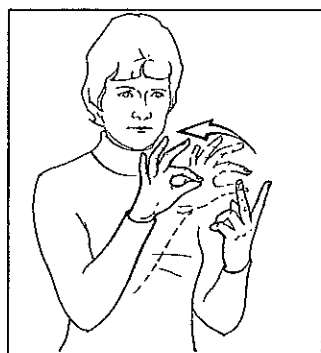
(a) **SAD**
"long-faced, gloomy"



(b) **JUDGE**
"thoughts being weighed"



(c) **ATTENTION**
"blinders help to concentrate"



(d) **CHOOSE**
"making a selection"



(e) **POSTPONE**
"the decision to act is moved farther away"

At the beginning of our studies of American Sign Language (ASL) we were perplexed by this paradox. In the scanty literature about signs and signing (there were few linguistic studies of sign language in this country, with the exception of important contributions by William Stokoe: Stokoe 1960, Stokoe et al. 1965), earlier observers, too, almost invariably stressed their impression of the language as being pictorial, pantomimic, concrete, iconic—"a loose collection of pictorial gestures," as one observer put it (Lewis 1968). If these impressions were valid, American Sign Language would be essentially different from spoken language, for there is a long tradition in linguistics that characterizes the lexical items of language as abstract symbols, as essentially arbitrary, the form of a morpheme having no part-for-part relation to the form of what it denotes.

It is true that in deaf communication, mimetic aspects are very much alive and mimetic representation is the source of many symbols used in signing. Handbooks of ASL signs often give the idea behind the sign, which may be historically correct or may be invented or contrived. For example, for the sign SAD¹ Riekehof (1963) gives "long-faced, gloomy"; for JUDGE, "thoughts are being weighed in the balance"; for ATTENTION, "blinders help one to concentrate"; for CHOOSE, "making a selection"; for POSTPONE, "the decision to act is moved farther and farther away" (see figure 1.1).

When deaf children learning ASL as a native language want to express something for which they do not know the sign, they freely invent signs, neologisms often exhibiting clear mimetic properties. One three-year-old deaf child invented a sign for 'cinnamon roll' which she made with a cupped hand representing the roll and an active pointing hand indicating the swirls of cinnamon sugar on top (figure 1.2a); she invented a sign for 'milkshake' which represents the twirling movement of a blender (figure 1.2b). Another of her inventions was a mimetic sign for 'sand crabs' (figure 1.2c).

In addition to their mimetic quality, however, such inventions often exhibit certain formal qualities not characteristic of free pantomime; the handshapes, the locations, and the movements are conventional in ways characteristic of existing ASL signs. Many existing signs are made with the cupped hand the child used in her invention for 'cinnamon roll' and many existing signs are made on the palm of the hand, as is the child's invented sign for 'milkshake.'

Inventions of new signs by adult signers often demonstrate this same combination of mimetic and conventional elements. When deaf researchers in our laboratory needed to refer to a videotape recorder, for which there was no regular ASL sign, they used the index fingers of

Figure 1.2 Nonce signs invented by a deaf child of deaf parents.

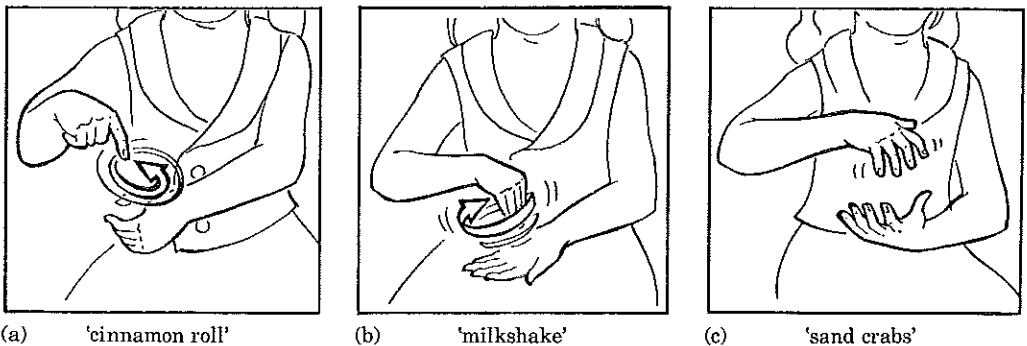
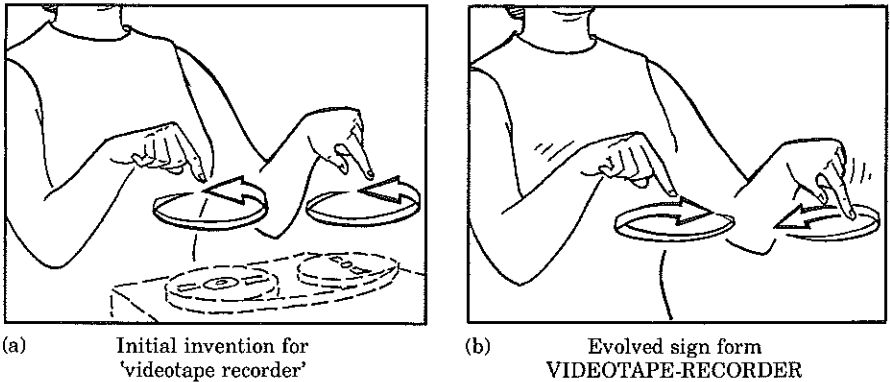


Figure 1.3 A recent neologism in ASL.



both hands moving counterclockwise (as the reels do) to indicate the tape moving from one reel to another. Within a short period of time, however, some of the realism of the representation was lost. The neologism is now made with the index fingers describing circles that both move inward (as figure 1.3 shows), no longer mimicking the way the reels actually move; the modification makes this representation more like other ASL signs.

As the domestication of such inventions suggests, despite the representational character of many ASL signs there is another aspect to their form. Signs of ASL may be systematically described and differentiated in terms of their formational properties. This description was first undertaken by Stokoe (1960), who analyzed signs as simultaneous compositions of a limited set of handshapes, locations, and movements. Descriptions of the formational properties of ASL signs have been further developed in the *Dictionary of American Sign Language* (Stokoe, Casterline, and Croneberg 1965), Stokoe (1972), Battison (1974, 1977), Friedman (1977), Klima (1975), and others. These analyses treat signs not as iconic representational wholes² but as compositions of a small set of regularly recurring formational values which formally differentiate signs. Like the meaningless sounds that make up words of a spoken language, the formational values themselves (for instance, particular handshapes, particular locations) are, out of the context of sign forms, arbitrary with respect to meaning. Further, there are abstract rule-governed constraints on the ways these values combine in constituting the lexical items of the language. If this new linguistic analysis is correct, ASL signs are not simply iconic (mimetic or representational) forms, but are composed of purely formal elements which func-

tion as differentiators between signs and conform to a specific set of systematic formal constraints.

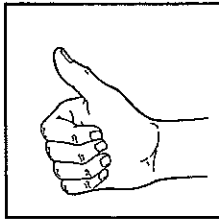
The first question to be asked about American Sign Language, then, is what roles these two aspects—iconic and arbitrary—play in this visual-gestural language.

Iconicity in Signing

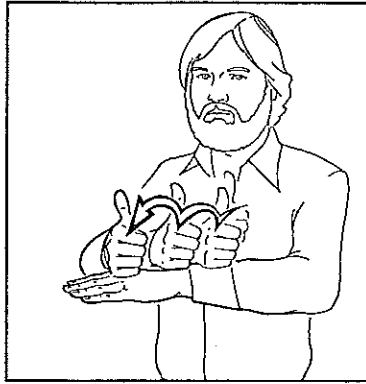
In communicating among themselves, deaf ASL signers use a wide range of gestural devices, from conventionalized signs to mimetic elaboration on those signs, to mimetic depiction, to free pantomime. The core vocabulary of ASL is constituted of conventionalized lexical signs. These are regularly formed and are made in a well-defined, limited signing space in the area of the head and torso. There are thousands of lexicalized signs in the ASL vocabulary, representing a full range of lexical categories and levels of abstraction. Some signs easily translate into English words and some have meanings not represented by single words in English. For instance, there are single, unitary signs that translate as the English nouns *lobster*, *sewing machine*, *government*, *idea*, *roller skating*, *assembly line*, *sightseeing*; the English verbs *cause*, *intend*, *digress*, *talk to oneself*, *restrain one's feelings*; the English adjectives *awful*, *ambitious*, *perfect*. There are unitary signs for adverbs like *instantly*, *approximately*, *for a long time*; for quantifiers like *lists of*, *hordes of*, *clumps of*; for pronouns like *the two of them*. In addition there are classes of signs that do not have exact counterparts in English, such as size-and-shape specifiers referring to cylindrical objects, relatively flat rectangular objects, small spherical or cube-shaped objects. There are pronominal-like classifiers that have no precise counterparts in English: one that represents persons, one for vehicles, one for inanimate objects (see figure 1.4).

In sentence contexts, lexical signs of American Sign Language can undergo many kinds of regular processes that change their form and meaning in systematic ways (see chapters 11 and 12). Beyond these regular processes, signs may be extended in special ways that are not at all systematic, but rather represent some mimetic elaboration to convey, for instance, a more precise description of an event or of a quality. Typically this elaboration takes the form of some nonregular, mimetic extension of the movement of a sign: for instance, the sign FIRE may be made in such a way that it reflects fire blown by the wind from side to side; the sign MOTORCYCLE may be made in such a way that its movement represents careening uphill, or moving slowly down a gentle incline, or turning corners at any angle, or bouncing on a bumpy road; the sign SNOW may be made in such a way that it represents snowflakes gently wafting downward; and so forth. Classifiers, in par-

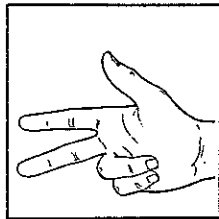
Figure 1.4 Pronominal-like classifiers and their use in mimetic elaboration.



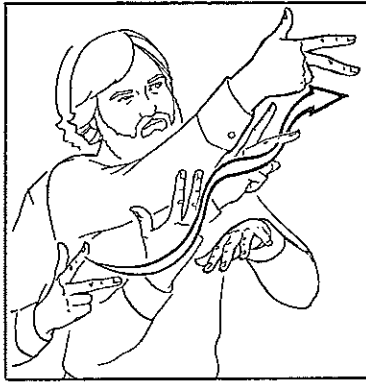
(a) OBJECT-classifier



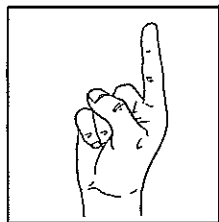
upright objects in a row



(b)VEHICLE-classifier



vehicle meandering uphill



(c) PERSON-classifier



person weaving as he walks

ticular, are manipulated to specify spatial locations and arrangements, and manners, directions, and rates of movement. Classifiers can mirror, for example, the path and manner in which a person, animal, or object moved from one place to another—leaping, loping, meandering, stumbling, weaving in and out, winding, moving up, down, or across (see figure 1.4). Thus some ASL signs can be manipulated in ways that make them mimetically mobile. Such mimetic elaboration of signs within the core vocabulary of ASL, recognizably different from regular modulations on signs, is not at all uncommon in conversational or narrative signing.

Beyond mimetic elaboration of regular lexical items, however, ASL communication also includes extrasystemic gesturing. In ASL sentences, nonconventionalized gestures are often interspersed with the signs. There is much mimetic depiction of shapes of particular objects (see chapter 10) and of actions. Such nonstandardized gestures are highly iconic and freely varying. Although they may incorporate some conventional elements, say a particular ASL handshape, they are not bound by the constraints on formation of ASL signs. Beyond mimetic depiction, ASL communication includes free pantomime in which the signer acts out in full a role or situation without observing any conventions of formation or constraints on signing space.

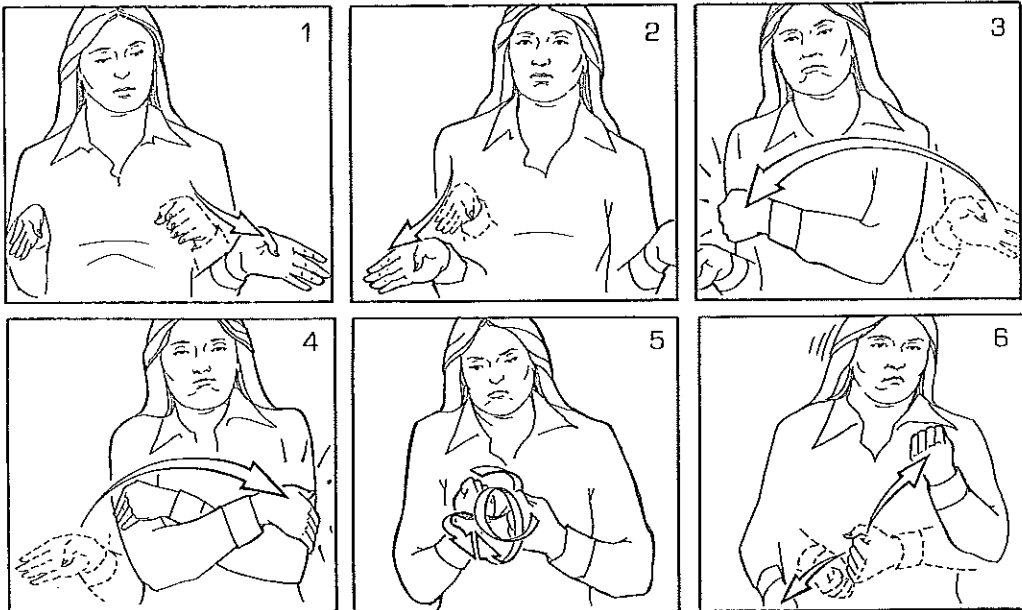
In ways that we do not yet understand, these gestures—from purely conventional to purely mimetic—frequently co-occur in ASL utterances; in ordinary conversation they can even be intertwined within a phrase. A regular sign can be made and then subjected to nonsignlike mimetic extensions: a description of someone spilling a cup of coffee might begin with the sign CUP made regularly and then moved mimetically to depict the spilling. Mimetic depiction or pantomime can even be freely substituted for regular signs.³ And ASL contains no obvious, direct signals that a signer is switching from signs to mime or back again.

When hearing-speaking people communicate, they too use gestures in varying degrees, but the gestures are clearly distinguishable from words. In signing, the various kinds of gesturing are in the same channel of communication as the regular lexical items. Since nonconventionalized gesturing is extensive and varied in deaf communication, and since it occurs in the same linguistic context as signing, a central question for the analysis of ASL is how to distinguish in the signing stream those gestures that constitute the lexical signs of ASL.

Mimetic Representation

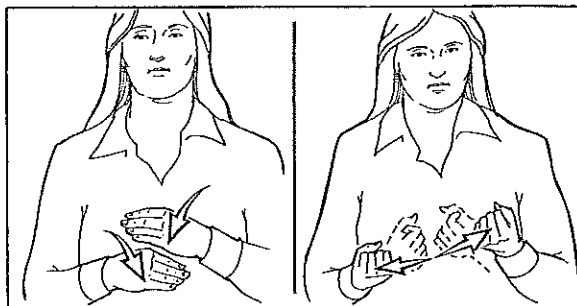
In order to analyze the distinction between mimetic representation and ASL signs, we studied signed narratives that elicited pantomimic

Figure 1.5 Progression from pantomime to invented sign.



(a)

Pantomimic representation of 'straitjacket'



(b)

Signlike reduction

representations interspersed in the flow of regular signs. This provided an opportunity to study the invention of nonsign representations by different signers and to observe changes in the representations of these concepts as the narrative progressed.⁴

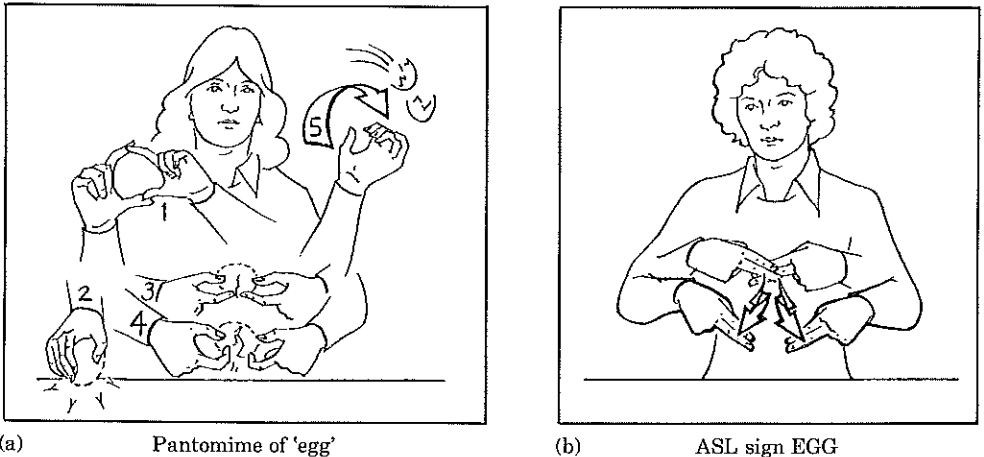
When several deaf signers were asked to sign James Thurber's story "The Unicorn in the Garden," we found that there is no commonly accepted sign for 'straitjacket,' a concept that figures prominently in the story. To represent that concept, each signer produced a different pantomime, focusing on different characteristics of a straitjacket or the act

of getting into one. These pantomimes depicted putting arms into sleeves, fastening cords, crossing arms, tying different kinds of knots, pulling tight, constraining the wrists. For each signer the initial representation was the most elaborate, involving as many as five actions in sequence. At later points in the story and in subsequent retellings, representations were often reduced to two or even one highly abbreviated gesture, taking on signlike handshape, movement, and location. Figure 1.5 presents a typical example of the change from a highly pantomimic to a highly signlike representation of 'straitjacket.' The final elliptical representation is still iconic—that is, elements of its form are directly related to what it represents—but the movements are condensed, simplified, stylized. In fact, the rhythm of the final representation resembles the rhythmic properties of an ASL compound sign, although the components here are not existing ASL signs (see chapter 9).

Comparison of Pantomime and ASL Sign

To establish specific criteria for distinguishing ASL signs from pantomime, we asked ten nonsigners to convey in gestures the meanings of individual English words for which there are corresponding ASL signs. One of the words was *egg*. Though renditions differed, most pantomimes included a series of activities and most of them shared thematic elements: picking up a small oval-shaped object, hitting it against the edge of a real or imaginary surface, breaking it open and emptying its contents, putting the two halves of the imaginary shell into one hand and throwing them away (figure 1.6a). The way these

Figure 1.6 Comparison of pantomimic rendition of 'egg' and ASL sign EGG.



thematic elements were realized varied greatly from subject to subject; details of the individual renditions were entirely different.

By contrast, consider the movements in signing EGG in American Sign Language. As figure 1.6b indicates, the ASL sign EGG is clearly related to one action within the complex pantomimed sequence: namely, the breaking open of the eggshell. But the relation between the sign itself and the action is a highly stylized one. Two fingers of one hand cross the same two fingers of the other hand in a way that would not occur if one were realistically depicting holding an egg. Thus, although the sign suggests an element of the pantomime, the two performances are distinctly different.

Whereas the pantomimes portraying 'egg' varied from one person to the next, different renditions of the ASL sign EGG are recognizably the same across signers. For example, EGG requires a particular handshape; we have seen a deaf mother correct her deaf child's signing when the sign was made with four fingers outstretched instead of two. The mother's correction of the child's "mispronunciation" indicates that there is a recognizably correct way to form the sign EGG—that there are, in fact, conditions of well-formedness in ASL. In the pantomime it matters not at all how the hands are shaped in holding an imaginary egg nor how many fingers are straight or curved: what counts is that the hands are held as if surrounding or holding an egg-shaped object. In the final analysis, the distinction is between effective picturing of the concept and acceptable rendering of the inherent form of the sign—that is, between effectiveness in pantomime and well-formedness in signing.

To study more carefully some of the diagnostic characteristics of ASL signs that distinguish them from pantomime, we compared regular signs with pantomimes intended to convey the same meaning. We chose a set of signs that clearly retain a high degree of iconicity; in each case the sign is close in form to a possible pantomimic representation of movement associated with its meaning: ZIPPER, because it looks like pulling a zipper up and down; APPLAUD, because it looks like hands clapping; BOOK, because it looks like a book opening; and so on. We recorded on videotape the signs and corresponding pantomimes as produced by Bernard Bragg, a deaf actor and mime artist. Bragg was requested to keep the pantomime and sign renditions as similar as possible to one another without violating what is natural to either mode.

In general, as for 'egg,' the pantomimes included a number of thematic images, the regular ASL signs only one. Moreover, the pantomimes were much longer and more varied in duration. Individual pantomimes ranged from three to twelve seconds, whereas individual

citation-form⁵ signs were all far shorter and more uniform in duration, most of them around one second.⁶

Slow-motion playback revealed a more subtle but clearly distinguishing difference. In pantomime, the hands can move directly from a rest position through a series of preparatory motions into the pantomime itself. A sign, by contrast, is characterized by a brief temporal holding of the handshape in its initial position (and often in final position as well). In producing a citation-form sign, the hands begin in a relaxed, nonspecific shape in a resting position; they move transitionally to the beginning of the sign, by which time they have taken on the specific handshape of the sign to be made; they hold briefly in this position before making the movement inherent to the sign itself. In addition to their greater variation and longer duration, pantomimes further differ from signs in being made with continuous motion.

The drawings in figure 1.7, tracings from Bragg's videotaped pantomime and sign for 'steal,' illustrate some of the distinctions that reveal criterial attributes of ASL signs. The first five drawings of the pantomime (fields 1–150)⁷ constitute a preamble representing a person glancing to the side as he furtively reaches over in preparation for snatching an object. The last seven drawings (fields 228–338) represent the act of stealing—and here the thematic image is the same as in the ASL sign. Bragg's total pantomime sequence takes 338 fields (over 5 seconds); his ASL version of the sign STEAL requires only 34 fields (about 0.5 seconds). Even if we omit the preamble sequence and count only the shared thematic image, that part of the pantomime is three times as long as the sign.

Other differences show how much freer the pantomime is than the sign. In the pantomime for 'steal,' the fingers are lax and not held in one of the specific handshapes conventional in ASL; by contrast, the sign starts with a definite characteristic ASL shape, two fingers spread. In the pantomime both hands move independently and differently; this never occurs in a sign. The pantomime involves reaching all the way across the body to the contralateral side beyond the elbow and then making a large sweeping motion back; movement in the sign is reduced, precise, and well specified, the two fingers bending as the hand moves upward and to the right along a single vertical plane parallel to the torso—a conventional movement within the signing space. The pantomime includes head and body movement; in the sign, only the hand moves. Finally, in the pantomime the eyes participate in the action, sometimes anticipating, sometimes following the hands; in signing, Bragg makes direct eye contact with the camera (or addressee) throughout the sign.

The other pantomimes rendered by Bragg were, like this one, realis-

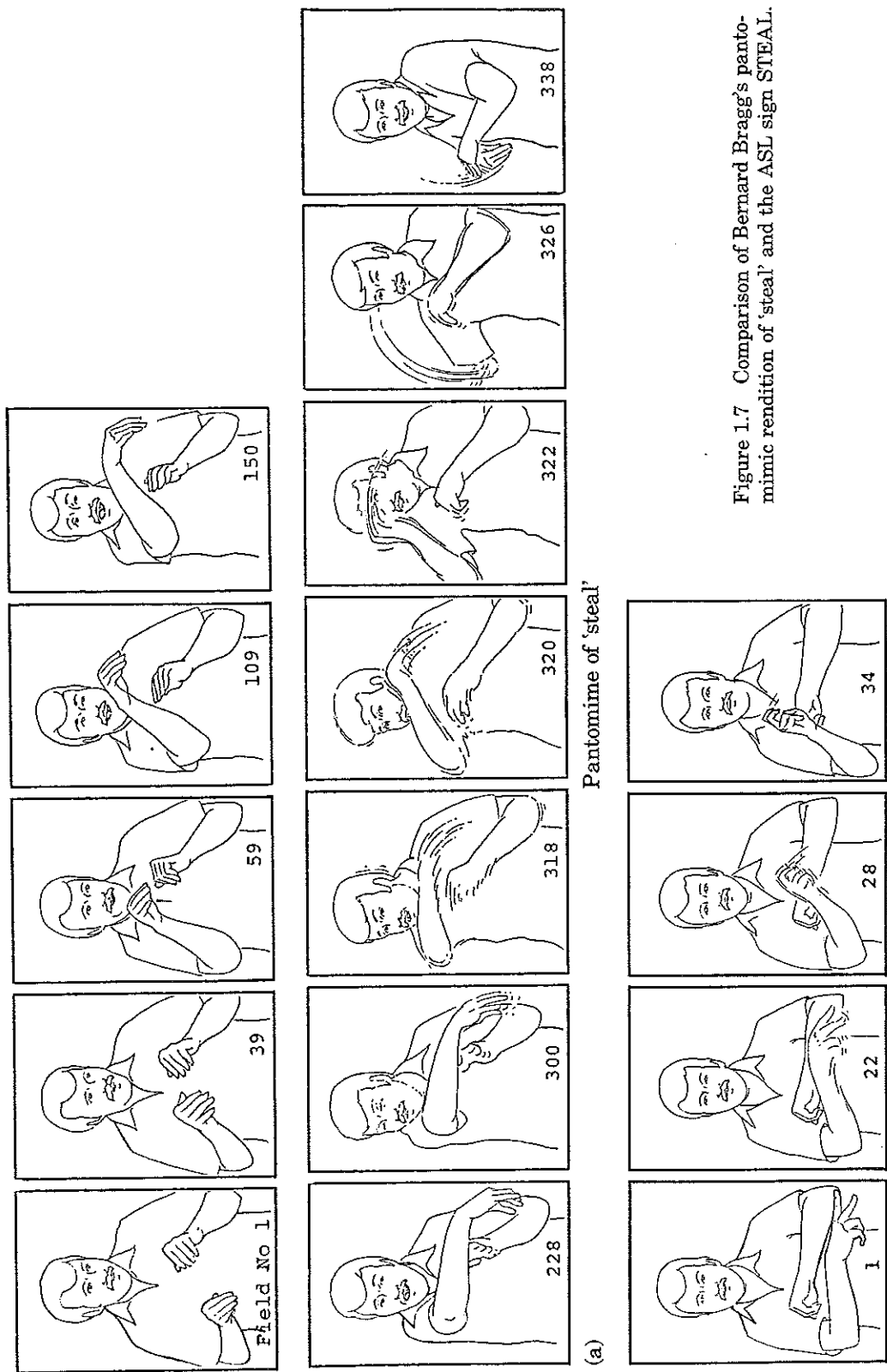


Figure 1.7 Comparison of Bernard Bragg's pantomimic rendition of 'steal' and the ASL sign STEAL.

ASL sign STEAL

tic in duration, size, and direction of movement. The signs, like this one, were condensed and were restricted to the hands alone and to well-specified handshapes, locations, and movements within a limited signing space. In the signs all dimensions were altered: compressed, restructured, and conventionalized.

Degree of Iconicity in Lexical Signs

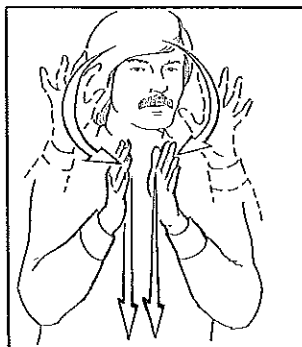
Although there are definite distinctions between regular ASL signs and the spontaneous mimetic representation characteristic of pantomime, even many regular ASL signs clearly exhibit traces of mimetic properties. Certainly the vocabulary of ASL—and, to our knowledge, that of other primary sign languages—is a great deal more iconic than are the morphemes of spoken languages.

Of course, that there *is* an iconic relation—that elements of the form of a sign are related to visual aspects of what is denoted—does not in any way determine the actual details of the form. Consider the ASL sign for 'tree.' As figure 1.8a shows, it is made with the forearm upright, the hand spread wide, and a twisting of the wrist and forearm. One could say that the upright forearm represents the trunk, the outstretched hand represents the branches, and the twisting motion represents the branches moving in the wind. In Danish Sign Language the sign for 'tree' (figure 1.8b) differs in all details from the ASL sign, and yet it too is iconic: the two hands symmetrically outline the rounded shape of a tree's top and then outline the shape of the trunk. The sign in Chinese Sign Language (figure 1.8c) is yet again different but still iconic: the two hands symmetrically encompass the shape of a tree's trunk and move upward. Though the signs in these three languages are entirely distinct, both in the characteristics of trees they

Figure 1.8 The sign for 'tree' in three different sign languages.



(a) American Sign Language



(b) Danish Sign Language



(c) Chinese Sign Language

represent and the ways these are expressed in forming the signs, the signs are all iconic.

As a first step toward assessing the degree of iconicity of ASL signs, we designed two studies that approach this problem from different angles. One study asks the question: How transparent or self-evident are ASL signs? That is, given a sign, to what extent can a nonsigner—in the absence of any prior knowledge—guess its meaning? The other study asks: How obvious is the basis for the relation between a sign and its meaning? That is, given a sign and its meaning, to what extent do nonsigners agree on the basis for the relation between the two?

Transparency of Signs

Can a nonsigner presented with an ASL sign (and no other information) correctly ascertain its meaning? To the extent that a sign's meaning can be understood from its form alone, a sign is considered transparent.

Ninety signs were presented on videotape to a group of ten hearing subjects who had no prior knowledge of sign language.⁸ Previous experiments had shown these 90 signs to be commonly known among deaf ASL signers and fairly directly translatable into English nouns. They included items like APPLE, BIRD, BOY, CANDY, EARTH, FRIDAY, GRAVY, IDEA, MEAT, SCIENCE, SENTENCE, TREE, WEEK—that is, both abstract and concrete nouns. Signs were made by a native signer; they were produced in citation form and with neutral facial expression.⁹ Subjects were instructed to write down a meaning for each sign immediately after its presentation.

Not a single subject was able to guess the meaning of 81 of the 90 signs presented. The few signs that were transparent to even one of the hearing subjects were BED, BUTTON, EAR, EYES, MARBLE, MILK, OPERATION, PIE, and SURPRISE. But for each of these signs many responses were not acceptable translations. For the other 81 signs, the subjects made only incorrect and highly varied guesses. For these ASL signs, meaning is not self-evident from form alone.

In a less demanding investigation of transparency, we constructed a multiple-choice test in which we listed the correct English translation and four other possible meanings for each ASL sign. Most alternatives were selected from the responses given to the sign by the subjects in the free-response test; thus some of the alternatives were intuitively likely, though incorrect, meanings. As an example, for the sign glossed as HOME (figure 1.9) the choices listed were *kiss*, *math*, *home*, *comprehend*, *orange*.

A new group of ten hearing, nonsigning subjects viewed the 90 signs and marked the response that corresponded to what they thought the

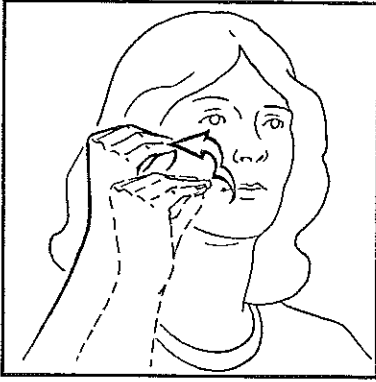


Figure 1.9 The sign HOME as presented on videotape for multiple-choice test.

sign meant in ASL. These subjects did no better than chance at choosing the correct meaning for a sign: on a test in which each item provided five choices, chance level would be 20 percent correct; on this test 18.2 percent of the responses were correct.

For only a few of the signs (12 out of 90) did a majority of subjects select the correct meanings. The 12 transparent signs were BED, BLOSSOM, BODY, BOTH, BUTTON, DAY, EAR, EYES, ODOR, OPERATION, SURPRISE, and YEAR. Note that six of these signs had generated at least one correct response on the free-response test. For a large number of signs on the multiple-choice test (36 out of the 90) not one of the subjects selected a correct meaning.

Thus, even when subjects were required only to *select* the correct meaning of a sign, they were rarely able to do so. According to this criterion of iconicity, most of the ASL signs in the list were not transparent but opaque.

Relation between Sign and Meaning

In a still less demanding investigation of the iconicity of signs, we presented to a new group of ten nonsigning subjects the 90 videotaped signs, each followed by a spoken presentation of its English translation. Subjects were instructed to describe what they considered the basis for the relation between the form of each sign and its English translation-equivalent. A corresponding task for a spoken language would be to ask English-speaking subjects who know no German what it is about the sound of the German word pronounced [hunt], *Hund*, that suggests a dog, or about the sound of the German word [bayn], *Bein*, that suggests a leg. With most common German words, there would of course be no obvious answer to the question.

The task instructions explained that ASL signs are often said to be representational and included an example of an iconic sign not on the list, CAR, paired with its meaning and accompanied by the suggested possible response that it represents turning the steering wheel of a car.

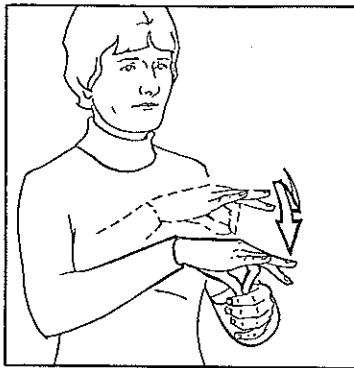
Subjects provided a written response for each sign-and-meaning pair. For more than half of the 90 signs presented, the responses of the subjects showed overall agreement on the basis for the connection between the shape of a sign and its meaning. For example, when the sign produced was the one we gloss as VOTE and the subjects were told that it means 'vote' (figure 1.10a), they were in general agreement on their responses; subjects wrote "putting a ballot in a ballot box," "placing vote in a ballot box," "motion of placing ballot in container," "ballot in a box," and other equivalent responses. For the sign WOOD (figure 1.10b), they responded "sawing a board," "motion of sawing as in sawing pieces of wood," "sawing motion on board," "sawing action," "sawing a log," and other equivalent responses. We compiled lists of responses on which there was overall agreement. Some typical responses:

<i>Sign</i>	<i>Relation between sign and meaning</i>
TRAFFIC	cars passing each other
TENT	the poles of a tent
QUEEN	sash worn across the shoulder
GRAVY	drippings from a piece of meat
GIRL	the soft cheek of a girl
TREE	trunk and branches of a tree
WEEK	one line across the calendar
TICKET	punching a ticket
MELON	thumping for ripeness
LETTER	placing a stamp

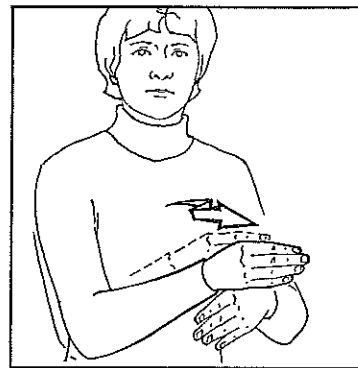
The results of this study support the notion that many ASL signs indeed have a representational aspect. Specifically such signs are what we call translucent; that is, nonsigners essentially agree on the basis for the relation between the sign and its meaning.¹⁰ This need not, of course, mean that the agreed-upon basis corresponds to historical fact. The ASL sign GIRL, for example, did not in fact originate from a representation of "the soft cheek of a girl" as our nonsigning subjects said (figure 1.11). According to historical sources the sign originally represented either the bonnet strings of hats worn by young girls or the curls that lay along their cheeks.

For some of the signs there was not overall agreement in responses; the bases described ranged widely from subject to subject. For example, for the sign CANADA (figure 1.12) some responses were "close neigh-

Figure 1.10 Examples of translucent signs, and typical responses.



(a) VOTE
"putting a ballot in a box"

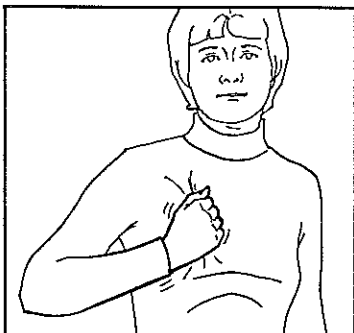


(b) WOOD
"sawing a board"



GIRL
"the soft cheek of a girl"

Figure 1.11 Example of seemingly translucent sign and typical response.



CANADA

Figure 1.12 Example of opaque sign for which there was no typical response.

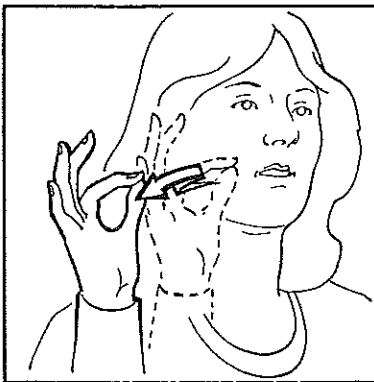
bor,” “fine woolens,” “someone proud of what he is,” “sounds like collar,” “you need a coat because winters are colder than in the U.S.” Other signs for which there was a wide variety of responses included AMERICA, APPLE, COLOR, EARTH, FATHER, HOME, SCIENCE. Nonetheless, the subjects agreed in specifying the relation between form and meaning in what was to us a surprising number of instances—certainly far higher than we would predict if the items presented were spoken words in an unknown language.

Thus, although an ASL sign is not usually so unambiguously representational that a nonsigner can guess its correct meaning—not even when the meaning is presented as one of several possibilities—characteristics of the form of an ASL sign often are related (or relatable) to characteristics of its referent.

The Submergence of Iconicity

Studies with hearing nonsigners show that ASL signs are more iconically transparent than are the words of spoken languages. What difference does such iconicity make for the native users of the language—for deaf people, children of deaf parents, who learned ASL as their first language? What is the role of the iconic aspects of ASL signs in the rapid processing that goes on in conversational signing? The paradox of ASL signs is that they can have global aspects that are clearly representational or iconic (the sign CAT, for instance, appears to represent the whiskers of a cat; see figure 1.13); yet at the same time they can be analyzed as composites of elements that serve as purely formal differentiators between signs (the sign CAT is made with one hand in a

Figure 1.13 The two faces of sign: the whiskers of a cat (iconic) and a pinching handshake brushing along the cheek (componential).



pinching handshape repeatedly brushing on the cheek; this handshape, movement, and location regularly recur in ASL signs). Which of these two faces of signs is predominant in normal processing?

This question has been focal in our research. The evidence from several studies clearly answers that it is the noniconic, arbitrary formational properties of the language that predominate at certain levels in coding and processing ASL signs (see part II). Furthermore, although the iconicity of signs may be enhanced in many special linguistic activities, it is often submerged when signs undergo general grammatical processes (see part III).

Insignificance of Iconicity in Processing Signs

Studies of immediate memory for signs strongly suggest that the iconic aspect of signs is not relevant in such encoding and remembering processes. The fact that in speech, phonological similarity among linguistic items has a detrimental effect on recall in immediate memory has been used to argue that those properties are significant in encoding processes (Norman 1976). We compared immediate memory (ordered recall and free recall) for lists of highly iconic signs (such as TICKET, MELON, LETTER, GRAVY, TREE) and lists of signs that are low in iconicity (such as COLOR, MOTHER, INDIAN, PENNY, FOX). If the iconicity of signs had some effect in immediate memory and recall, we would expect to find differences in recall of the two types of lists. However, there was no overall difference in the percentages of items correctly remembered between the two types of lists, in either ordered- or free-recall conditions, suggesting that the degree of iconicity of signs does not play a role in such processing (Bellugi and Tweney, in preparation).

But when we compared immediate memory (ordered recall) for lists of signs that shared formational properties (such as AMERICA, MACHINE, CHEESE, PAPER, SOAP) with lists of signs that had no similarity in form (lists matched with the first set for ease of recall), there was a significant difference between the two types of signs: the percentage (of lists and of items) correct was significantly higher for random lists than for the matched formationally similar lists. Formational similarity (in this case similarity of handshape and location) has a decided detrimental effect on immediate memory, which argues for the significance of these formational properties in such encoding and remembering (see chapter 4 for similar phenomena with respect to spoken words).

Studies of certain phenomena of everyday signing behavior (the production of signs in discourse) support the results of the memory experiments, suggesting that the component formational properties of signs

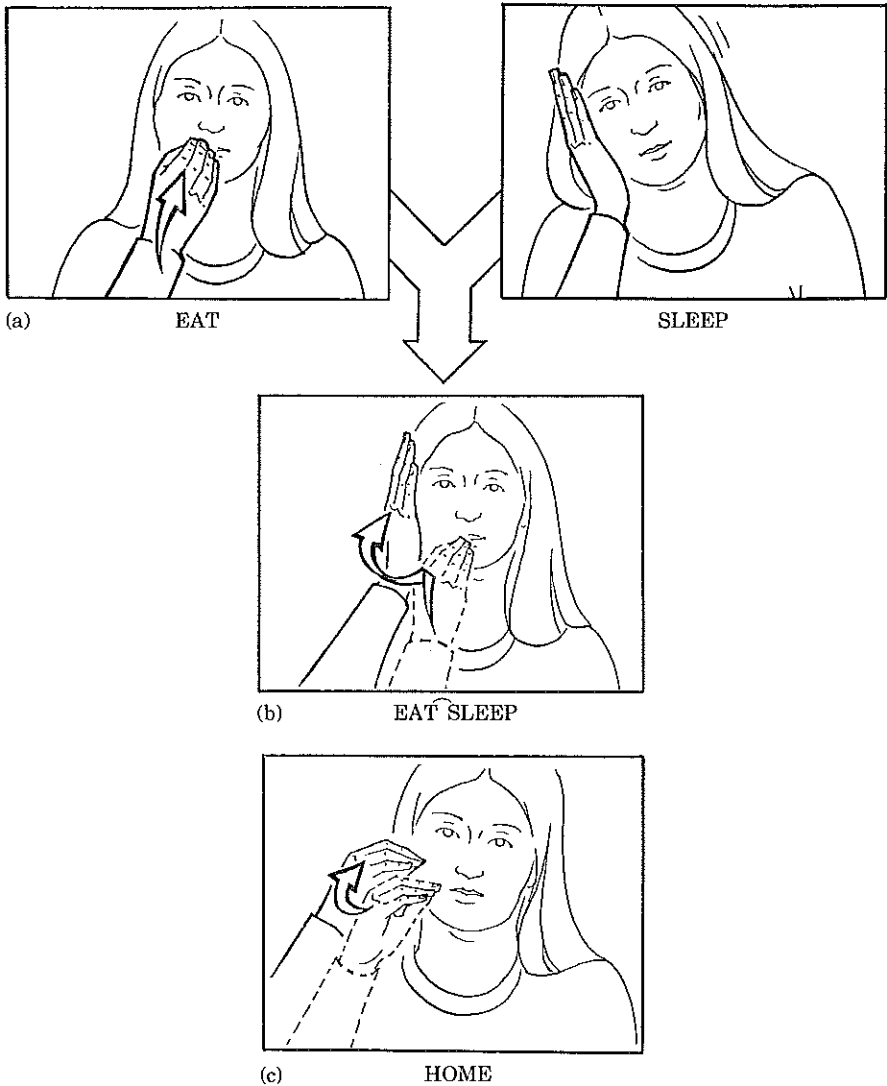
are functionally independent. Especially revealing is one class of spontaneous errors that occur in sign production, the slips of the hand that appear when elements of an intended message are transposed. Global transpositions of whole signs are rare; the overwhelming majority of unintended exchanges in sign production are transpositions of particular handshapes, particular locations, or particular movements. This provides added evidence that the linguistic parameters posited for ASL signs are psychologically real for deaf signers (see chapter 5).

A comparison between sign forms in two independent sign languages (Chinese and American) again suggests that there are indeed abstract formational constraints on the lexical items of the language. Some handshapes, locations, and movements are language-specific and may function differently in combination in different languages (see chapter 6). In addition to their iconic representational qualities, then, signs exhibit another level of organization, a componential level. ASL signs appear to be processed, coded, and produced by native signers, not in terms of their overall representational qualities, but rather as constituted of a limited set of elements of a combinatorial system. Furthermore, the recurring systematic components of signs, when considered outside of sign contexts, are, in general, arbitrary with respect to meaning.

The coexistence of the iconic and the arbitrary face of signs may seem paradoxical. However, studies of recent historical change in signs may provide some clues to sources of this coexistence. Frishberg (see chapter 3) shows that many ASL signs, in their contemporary form, have lost much of their original transparency. The direction of change in particular signs over the past century has been from the more iconic and representational to the more arbitrary and constrained, conforming to a tighter linguistic system.

A classic example of this change is the current ASL sign HOME, which turned out to be opaque in both of our iconicity studies (see figure 1.14). Hearing nonsigners never guessed 'home' or any related meaning, and even when the meaning was given along with the sign, there was no agreement on the basis for the relation between the two: our subjects responded with 'familiar,' 'touch base,' 'close to a person,' 'feminine and masculine,' 'moves backwards like going home,' 'where I speak the most.' Not one of our subjects guessed that the sign HOME is directly related to eating and sleeping. But, in fact, the current opaque sign HOME is historically a merged compound,¹¹ deriving from the two highly transparent ASL signs EAT and SLEEP: the ASL sign EAT represents bringing something to the mouth; the ASL sign SLEEP places the palm at the side of the head as if the signer were laying his head on his hand. In the compound, over time, the form of the two signs

Figure 1.14 The suppression of iconicity through historical change in compounds: (a) mimetic signs, (b) formal compound, and (c) modern opaque sign.



changed until the current merged sign is no longer a compound: the same handshape prevailed throughout the sign; the contact points moved closer together so that instead of one contact on the mouth and one on the cheek there are now two separate contacts on the cheek alone (see figure 1.14). A consequence of these changes is a complete

loss of the iconicity of the original two signs; the sign HOME is now one of the more opaque signs of ASL. Such historical change in signs suggests what appear to be systematic pressures in ASL toward constraining its lexical elements toward more opaque forms.

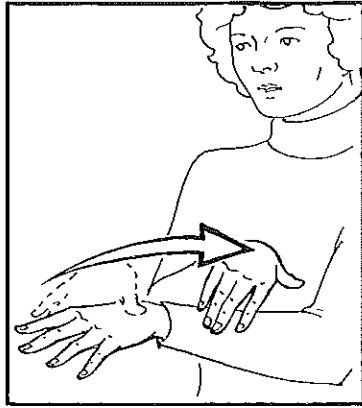
Grammatical Processes and the Suppression of Iconicity

The abstract property of American Sign Language is most clearly reflected in the kinds of regular grammatical processes that signs undergo. It has long been thought that visual-gestural communication such as ASL exists only as a loose collection of otherwise linguistically unrelated forms—that, for instance, sign operates with “indistinct parts of speech” (Crystal and Craig 1978). In fact, as part III will indicate, ASL signs are organized into abstract lexical categories that are clearly distinct. ASL signs undergo regular rule-governed operations to change their form and their meaning in a large number of ways. Far from being a loose collection of gestures, ASL is a language with a complex grammar, both at the level of internal structure of the sign and at the level of operations that signs can undergo as they are modulated for special meaning within ASL sentences. None of these operations derive from those of English; the principles on which they are based are directly suited to a visual-manual rather than auditory-vocal language.

Regular grammatical processes operate on ASL signs without reference to any iconic properties of the signs themselves; rather, they operate blindly on the form of signs. One of the most striking effects of regular morphological operations on signs is the distortion of their form so that iconic aspects of the signs are overridden and submerged. This is the case even when the operations may themselves exhibit some degree of iconicity. For instance, as a way of intensifying the meaning of a sign, a way of adding stress, a sign may be made with a very rapid tense movement. The sign SLOW is made in citation form with one hand moving along the back of the other hand. But under a regular morphological operation on the sign resulting in the intensified meaning ‘very slow,’ the movement of the sign is *not* elongated or made more slowly; rather, the meaning ‘very slow’ is regularly conveyed by making the sign with an extremely short, rapid movement. Thus the form of ‘very slow’ is incongruent with the meaning of the basic sign (figure 1.15a).

Other operations on signs similarly change their form in ways that obscure iconic properties. According to a handbook of signs, the sign YEAR indicates “the earth revolving around the sun”: one hand in a fist remains stationary, representing the sun; the other hand, also in a fist, makes a revolution around it, representing the movement of the

Figure 1.15 The suppression of iconicity under regular operations on signs.



(a) SLOW



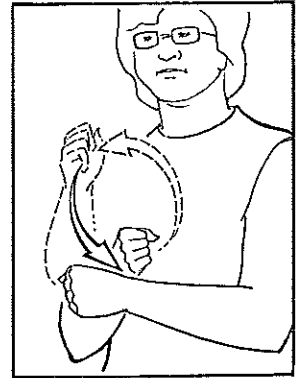
'very slow'



(b) YEAR



'every year'



'for years and years'

earth. To change the meaning to 'every year,' the active hand brushes forward on the base hand repeatedly; to modulate the sign to mean 'for years and years,' the active hand moves above the base hand in a circle (see figure 1.15b). In both cases, when the active hand assumes a movement regularly adopted for that change in meaning, it no longer revolves around the stationary hand and the original iconic representation of the earth revolving around the sun is completely lost.

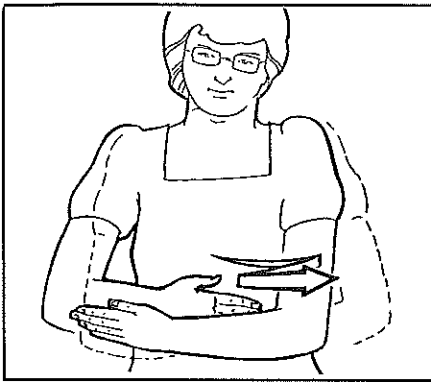
The sign **BABY** is a highly iconic sign, derived directly from the pantomimic act of holding and rocking a baby. By a regular process the sign can be changed in form to mean 'to act like a baby,' or 'babyish.' The sideways rocking motion disappears; the movement becomes an intense downward jerk repeated in a way that would be inappropriate

Figure 1.16 The progression from pantomime to ASL sign to modulated sign: suppression of iconicity.



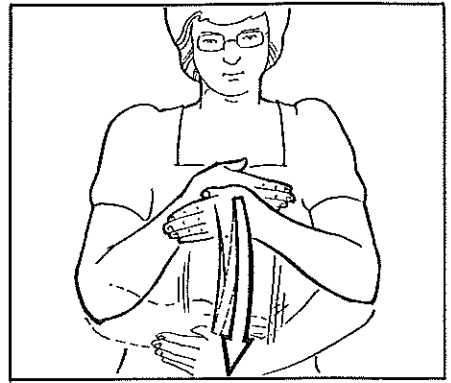
(a)

Pantomimic representation of 'baby'



(b)

The ASL sign BABY.



(c)

Modulated form meaning
'to act like a baby.'

for the meaning of the original sign. The change in form completely submerges the iconicity of the root form of the sign BABY. (Figure 1.16 shows the progression from the pantomime, to the ASL sign BABY, to the modulated sign meaning 'babyish'.)

The Paradox of Iconicity

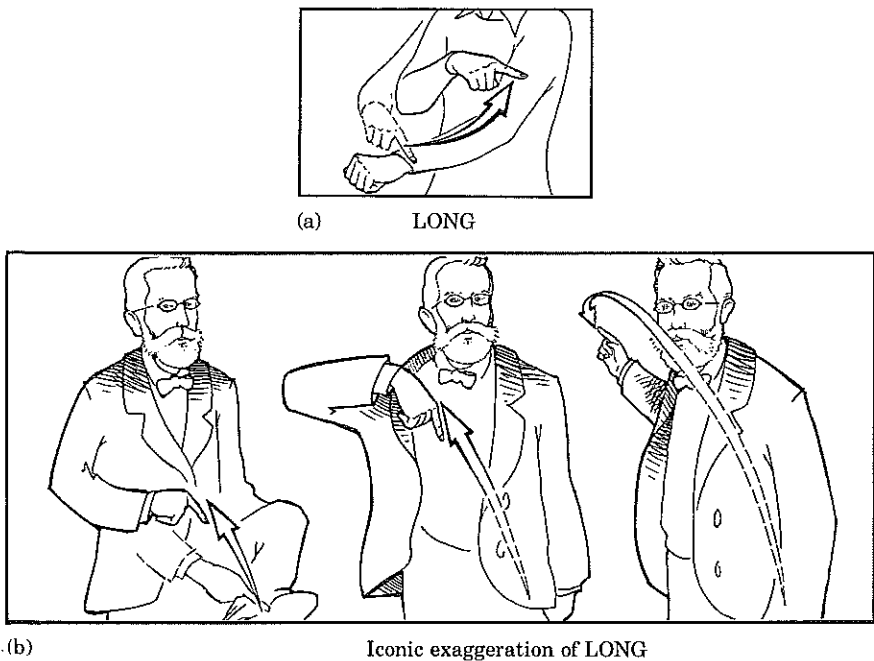
Despite the apparent historical, processing, and grammatical pressures toward submerging the iconicity of signs, ASL remains a language far more freely mimetic than spoken languages. As Tervoort (1973) puts it:

The manual sign not only functions as a global whole, it also can and does derive great expressive force, directness, and unambiguousness from representing what it stands for through indication of its shape or movement, outline,

or any other typical visual characteristic. This is at least how signs usually are born . . . and no matter how much they mature into arbitrary and conventional signs thereafter, they retain a dormant relation to this force that can be reawakened at any time . . . 'Iconicity' is not a more or less *accidental* feature because it comes to the surface only once in a while, but a basically *concomitant* characteristic that is potentially present all the time. (p. 357)

Deaf people are acutely aware of the undertones and overtones of iconicity in their vocabulary. When teaching signs to hearing people, deaf signers stress the iconic potential of signs, often inventing some iconic interpretation for mnemonic purposes. In communicating among themselves, or in narrative, deaf signers often extend, enhance, or exaggerate mimetic properties; colorful signing and plays on signs are sometimes based on elaborations of their mimetic character. In one instance, occurring in a film made in 1913,¹² an elderly deaf signer signed that he hoped it would not be "long before we meet again." The ASL sign LONG is made with the index finger of one hand moving along the back of the wrist of the other hand and part way up the forearm. The signer expressed himself instead in an exaggerated rendition of the sign, elongating it from his left toe up across his body and ending above his right shoulder (figure 1.17); LONG became literally as long as it could possibly be made on the human body. Another common kind

Figure 1.17 An ASL sign and a playful iconic elaboration of that sign.



of elaboration is illustrated by a signer who made the sign BUTTERFLY and then made the hands flutter around as a butterfly would move (Coulter 1975).

Manipulation of the iconic aspect of signs also occurs in special heightened uses of language: in one poem about the creeping pace of summer, the sign SLOW was made with such exaggerated slowness that it took twice as long as any other sign in the verse; the sign SUMMER ("wiping perspiration from the brow") in the same verse was made with such exaggeration that it evoked the heat of summer at the same time that it named the season (see chapter 14).

Thus ASL remains a two-faceted language—formally structured and yet in significant respects mimetically free.

Summary

The gestures used for communication among deaf signers of American Sign Language include a range of forms from lexical signs to mimetic depiction to pantomime, all of which occur in the same channel in deaf discourse. Lexical ASL signs themselves exhibit two faces: the iconic, representational aspect and the formal, componential arbitrary aspect. As we shall show in detail in subsequent chapters, under many conditions the iconic aspect of signs is obscured. The iconic face does not show at all in the processing of signs in immediate memory. Historical change diminishes the iconic properties of ASL signs; some signs become more opaque over time, some completely arbitrary. Grammatical operations that signs undergo can further submerge iconicity. Thus many signs, while having their roots deeply embedded in mimetic representation, have lost their original transparency as they have been constrained more tightly by the linguistic system.

But iconicity in ASL is not a buried etymological legacy. Newly coined signs are frequently based on mimetic representation of shape, action, or movement. Moreover, iconic properties of established lexical signs are always potentially available and are exploited by signers to add dimension and color to their expressions. The two faces of this language of shapes moving in space are ever present and ever provocative.