Do signers gesture?

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CHAPTER 8

Do signers gesture?

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Introduction

Before answering the title question 'Do signers gesture?' we must first answer the question 'What makes sign language different from gesture?' This analysis depends entirely upon one's definition of gesture. If gesture is defined sufficiently broadly, then the answer is 'nothing'. For example, Armstrong *et al.* (1995) define gesture as 'a *functional* unit, an equivalence class of coordinated movements that achieve some end (p.46; emphasis in the original).' Under this definition, speech itself, the gesticulation accompanying speech, pantomime, emblems, and sign language are all examples of gesture. However, the aim of this chapter is to explore whether we observe in signing a parallel to the gestures that hearing people use when they talk. Kendon (1980) refers to this phenomenon as *gesticulation* which is distinct from pantomime and emblems (conventionalized gestures such as the 'thumbs-up' sign). In this chapter, we will compare sign language primarily to the gestures (gesticulation) that accompany speech, rather than to pantomime, the early gestures of children, gesture 'systems' like home sign, or conventional emblematic gestures.

Some properties found in sign languages but absent in gestures accompanying speech

A review of significant differences between sign language and gesture provides an important backdrop for investigating whether and how gestures might accompany sign. Many authors have described the relation between sign language and gesture (e.g., Klima and Bellugi 1979; Kendon 1988; McNeill 1993), and the following lists some of the clearest distinctions, with specific examples from American Sign Language (ASL).

Sublexical (phonological) structure

Signs exhibit a systematic patterning of form (a phonology) not found in gesture. Signs participate in a system of minimal contrasts at the level of form, rather than
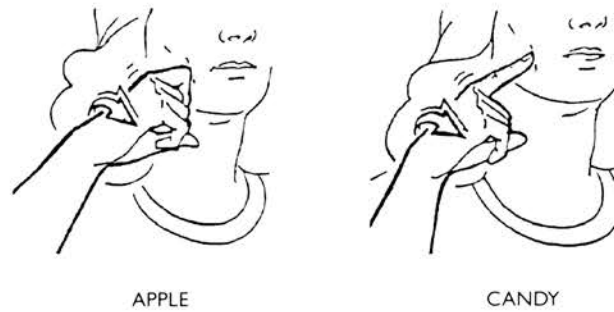
APPLE   CANDY

Fig. 8.1 Illustration of two ASL signs that contrast in handshape: APPLE (left) and CANDY (right).

meaning. For example, the signs APPLE[1] and CANDY differ only in handshape (see Fig. 8.1), but these handshapes do not themselves convey meaning (just as the /p/ and /b/ sounds in 'pat' and 'bat' are not meaningful). The 'X' handshape of APPLE is also found in the sign KEY, but does not contribute to the meaning of either sign. ASL contrasts about 36 different handshapes (Wilbur 1987), but not all sign languages share the same inventory. For example, the 't' handshape in ASL (the thumb is inserted between the index and middle fingers of a fist) is not found in Danish Sign Language. Swedish Sign Language contains a handshape not found in ASL: all fingers are extended except for the ring finger which is bent.

Like words, the articulation of signs is governed by a system of rules and form constraints. An example of a phonological rule in American English is the 'flap rule' in which /t/ and /d/ are pronounced as a flap when they occur between a stressed and an unstressed vowel (the tongue quickly hits the ridge of the mouth behind the teeth). Thus, a flap (rather than /t/) occurs in words like 'writer' and 'later' (compare with 'write' and 'late').

The following is just one example of a phonological constraint in ASL: 'secondary movement' (e.g., finger wiggling, circling, bending, hooking) can only occur at a particular time during the articulation of a sign. Perlmutter (1993) discovered that secondary movement is permitted only during the path movement of a sign or when a sign is held in space (with no preceding or following path movement). Figure 8.2a shows the correct form of GO-UP-IN-FLAMES in which finger wiggling must stop at the end of the sign when the sign is produced phrase-finally, and the ill-formed sign in which wiggling continues throughout the sign. Figure 8.2b shows the sign GERMANY also produced in a phrase-final position. In this case, wiggling must be executed throughout the sign's articulation, and the form parallel to GO-UP-IN-FLAMES is incorrect. Perlmutter accounts for the differences between these two forms by proposing that secondary movement can occur only on the nucleus (the peak) of a sign syllable (defined in terms of movement (M) and position (P) segments). Regardless of whether Perlmutter's syllabic analysis turns out to be correct, the point is that there are non-obvious constraints
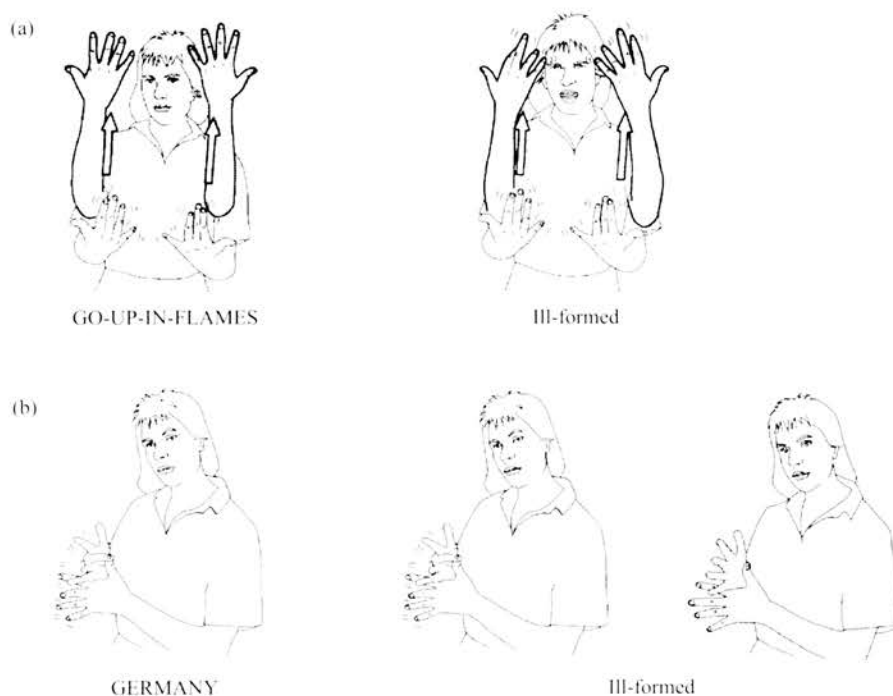
(a)

GO-UP-IN-FLAMES   Ill-formed

(b)

GERMANY   Ill-formed

Fig. 8.2 Illustration of a sublexical (phonological) constraint in ASL (see text). Correct forms of (a) GO-UP-IN-FLAMES and (b) GERMANY are shown on the left, with ill-formed versions on the right. Illustrations reproduced, with permission, from Perlmutter, D. (1993). Sonority and syllable structure in American Sign Language. In *Phonetics and phonology: Current issues in ASL phonology* (ed. G. R. Coulter), pp. 227–61. Academic Press, Inc., San Diego.

on the form of signs and that signers have clear intuitions about what is permissible and what is ill-formed. Such is not the case for gesture, and it may be the case that these types of form constraints are not observed even in the most 'language-like' gesture systems, such as home sign. Thus far, there is little evidence that home sign gestures are composed of combinations of meaningless elements or that systematic restrictions on form apply to such elements (see Chapter 7, this volume, for a discussion of home sign systems).

Lexical structure

Like words in all human languages, but unlike gestures, signs belong to lexical categories or basic form classes such as noun, verb, modal verb, adjective, adverb, pronoun, and determiner. Sign languages have a lexicon of sign forms and a system for creating new signs in which meaningful elements (morphemes) are combined. For example, Fig. 8.3 provides illustrations of the sign GIVE with various movement patterns which indicate different temporal aspects (ways of

performing an action). Sign languages tend to use non-concatenative combinatorial processes (similar to Semitic languages) rather than prefixation or suffixation. ASL exhibits the same types of morphological processes found in spoken languages, e.g., noun–verb derivation (Supalla and Newport 1978), compounding (Klima and Bellugi 1979), numeral incorporation (Chinchor 1983), and reduplication (Klima and Bellugi 1979), just to name a few.

These morphological processes are governed by constraints on ordering and on their application to particular forms. For example, in Fig. 8.3d the durational inflection applies after the exhaustive inflection to yield a form meaning 'give to each in turn, over a long time'. Such a verb could be used to describe someone at Halloween giving out candy to children, again and again, throughout the evening. In contrast, if the durational inflection applies prior to the exhaustive, as in Fig. 8.3e, the meaning of the verb is 'give continuously to each in turn', which could be used to describe a teacher who takes a long time to pass out papers to students (the papers are passed out once, but it takes a long time). Finally, the durational inflection can apply recursively, before and after the exhaustive, as in Fig. 8.3f. A verb inflected in this way could be used to describe a teacher passing out several papers to each student, and this action occurs throughout the day (e.g., for each class). Thus, lexical meaning is dependent upon the order of application of morphological inflections.

Morphological processes are also sensitive to the phonological form of a sign. For example, the nature of the reduplication that occurs after compounding is
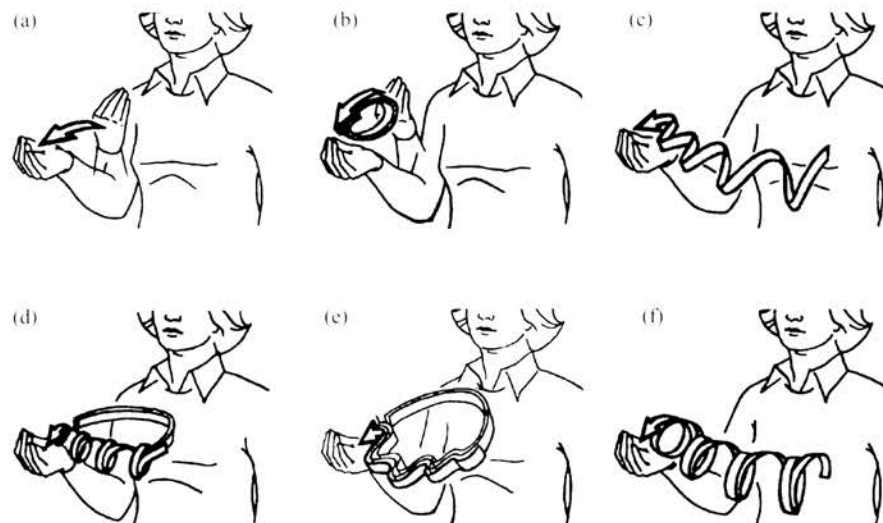

Fig. 8.3 Examples of aspectual morphology in ASL. The panels illustrate the sign GIVE with various movement patterns which indicate different temporal aspects. (a) GIVE (uninflected); (b) GIVE[Durational]; (c) GIVE[Exhaustive]; (d) GIVE[[Ex.]Dur.]; (e) GIVE[[Dur.]Ex.]; (f) GIVE[[[Dur.]Ex.]Dur.].

dependent upon the phonological form of the compound. Sandler (1989) found that whether the entire compound is reduplicated or only part of the compound depends upon whether the compound contains one or two independent movements. For example, the signs MIND and BLOW-UP can be combined to mean 'blow one's top,' and the resulting compound has two movements. Reduplication only applies to the second part of the compound. In contrast, the compound FAINT (derived from MIND and DROP) contains only one movement, and the entire form is reduplicated. Sandler suggests that morphological reduplication applies to the final syllable of a sign (MIND+BLOW-UP is bisyllabic and FAINT+DROP is monosyllabic). Note that reduplication adds the same meaning (repeated action) to both verb compounds as a whole—the meaning change is not restricted to the part of the compound that is reduplicated.

These examples show that the formation of signs is governed by a system of constraints which are sensitive to phonological form, lexical category, rule ordering, and semantics. Again, these properties are not found even in the most language-like gesture systems (pantomime and home sign). Even though gesture classes have been observed in various home sign systems (Goldin-Meadow *et al.* 1994), and home sign gestures have been argued to have a 'morphological' structure in which a gesture can be broken down into meaningful components (Goldin-Meadow *et al.* 1995), the gesture lexicon of home signers does not exhibit the hierarchical constraint-based system of generative lexical processes found in signed (and spoken) languages.

Syntactic structure

Gestures that accompany speech rarely occur in combination, and successive gestures do not form a larger hierarchical structure (McNeill 1992). In contrast, signs combine to form sentences which are governed by phrase structure rules and syntactic principles. For example, signers judge MAN OLD SLEEP-FITFULLY ('The old man sleeps fitfully') as grammatical, but OLD SLEEP-FITFULLY MAN as an ill-formed sentence. This judgement is not based on meaning—signers judge IDEA BLUE SLEEP-FITFULLY ('The blue idea sleeps fitfully') as also well-formed grammatically, but nonsensical. The basic word order of ASL is subject–verb–object (Fischer 1974), but other word orders can be derived through topicalization (Liddell 1980):

Basic word order:

(1) DOG CHASE CAT.   'The dog chased the cat.'

Topicalized object:

$$\overline{}t$$
(2) CAT, DOG CHASE.   'As for the cat, the dog chased it.'

Topicalization (indicated above by the 't') is marked by a nonmanual signal that is timed to co-occur with the manual sign(s). The ASL topicalization marker is a

combination of a backward head tilt and raised eyebrows. Topicalization in ASL is subject to the same universal 'island constraints' that apply to spoken languages (Lillo-Martin 1991):

Ungrammatical subject extraction:

_____t
(3) *MOTHER, I DON'T-KNOW 'WHAT' LIKE.

The above sentence violates the so-called 'WH island constraint', which states that an element (e.g., MOTHER) cannot be extracted from within an embedded clause of a certain type. Note that a resumptive pronoun 'saves' the sentence (from Lillo-Martin 1991):

Subject extraction with a resumptive pronoun:

_____t
(4) MOTHER, I DON'T-KNOW 'WHAT' PRONOUN$_a$ LIKE.
     'As for mother, I don't know what she likes.'

The presence of a resumptive pronoun permits the long distance dependency between elements in the matrix and subordinate clauses. Fischer (1974) has shown that ASL also obeys the 'complex NP constraint' (an element cannot be extracted from a complex noun phrase), and Padden (1988) showed that ASL obeys the 'coordinate structure constraint' (a dependency cannot occur between one element within the conjunct of a coordinate structure and another element outside that structure).

These few examples illustrate that ASL not only has rules for constituent ordering, but also exhibits subordinate clause structure and long distance dependencies, and follows universal constraints on syntactic form. Again, although Goldin-Meadow and Mylander (1990) found that home signing children combine gestures into sequences with a characteristic order (patient, action) and may even exhibit subordination, there is little evidence that home sign systems are subject to syntactic structure constraints found in spoken and signed languages, such as the 'island' constraints mentioned above, constraints on the distribution of various types of pronouns (e.g., rules regarding when reflexive and personal pronouns are allowed to be co-referential with a noun), or head feature conventions which state that a syntactic feature (such as tense) must be shared by a head node (e.g., a VP) and its head daughter (e.g., a V) within a syntactic tree. Clearly, the gestures that accompany speech do not have such syntactic properties and are not governed by these constraints.

Standards of form and a community of users

Finally, sign languages belong to a community of users who are systematic in their judgements of phonological, lexical, and syntactic form (with some limited individual and dialectal variation). In contrast, the gestures that accompany speech

are idiosyncratic with no agreed standards of form. Speakers vary in their tendency to gesture, and different individuals

> create their own gesture symbols for the same event, each incorporating a core meaning but adding details that seem salient, and these are different from speaker to speaker
>
> McNeill (1992), p.41

Furthermore, McNeill finds that in general, the gestures of people speaking different languages are no more different than the gestures of people speaking the same language. In contrast, sign languages used by deaf people in distant geographic locations may vary dramatically from one another.

Even for home sign, the standard of form is idiosyncratic, belonging to the individual. Goldin-Meadow and Mylander (1990) demonstrated that deaf home signers' gestures are quite different from their parents' gestures (see also Chapter 7, this volume). In particular, the parents' gestures lack the combinatorial properties found in the children's gestures. In addition, Kegl and McWhorter (1997) argue that home sign alone is not sufficient to support the spontaneous generation of a signed language. Kegl and her colleagues are documenting the emergence of Nicaraguan Sign Language (Senghas 1995; Kegl *et al.* 1999). At the earliest stage of development, there were only deaf home signers who came together in the schools in Managua in the early 1980s. However, these original home sign systems, even when used by adults, were not examples of spontaneously generated languages. Although these home sign systems were communicative, they often were no more than list-like labelling. Kegl and colleagues discovered that there was a stage of development that intermediated between various idiosyncratic home sign systems and the emergence of a full-fledged sign language. This intermediate stage was a pidgin which arose from the intercommunication among this critical mass of home signers. When young deaf children were exposed to this pidgin form of the language, creolization began to take place, and the kinds of grammatical properties described above for signed languages began to emerge. The Nicaraguan data indicate that the emergence of a true language is dependent upon a community of users and does not arise spontaneously in individuals.

Some properties found in gestures accompanying speech but absent in sign languages

In this section, we explore the nature of gestures that speakers use when they talk, focusing on aspects of gesticulation that do not appear to have a parallel in sign language. Most of the description of the relation between gesture and speech is from McNeill (1992).

Holistic form

Gestures are argued to have a 'global' and 'synthetic' form because their meanings are derived from the whole, not the parts, and many meanings can be synthesized

into a single gesture. The following example, from McNeill (1992), illustrates
these properties (brackets show the extent of the gesture):

(5) [and he's trying to run ahead of it]
     Hand moves forwards at chin level while fingers wiggle.

The gesture is symbolic of a character running at a particular height (in this
case, a cartoon character running along a wire above the street). McNeill (1992,
pp. 20–21) argues that:

'this gesture–symbol is 'global' in that the whole is not composed of separately meaningful
parts. Rather, the parts gain meaning because of the meaning of the whole. The wiggling
fingers mean running only because we know that the gesture, as a whole, depicts someone
running. It's not that a gesture depicting someone running was composed out of separately
meaningful parts: wiggling + motion, for instance.

In contrast, to describe someone running, an ASL signer might use a classifier
construction (a predicate in which handshape denotes an object of a specific
type), or a lexical verb could be used. For the classifier construction, the meaning
is derived from the combination of the handshape and its motion, and there are
language-internal constraints on the nature of the combination. For example,
signers could use either an inverted 'V' handshape denoting legs or a two-handed
body-part classifier with 'I' handshapes in which each index finger denotes a leg.
However, only the V classifier can be combined with path motion; if the body-part
classifier is used to indicate running, then the height and forward path of motion
must be indicated by a separate verb (Supalla 1990). This constraint is relatively
arbitrary, based on a distinction between ASL manner and path verbs.

The gestural depiction in (5) of running along a path is only understood as
symbolic of this event by virtue of its relation to the speech. In contrast, signs do
not take their meaning from another communicative signal. Figure 8.4 provides

(6)   (7)

Fig. 8.4 Illustration of the iconic gestures in examples (6) and (7). Reproduced, with
permission, from McNeill, D. (1992). *Hand and mind. What gestures reveal about thought.*
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further examples of the holistic and idiosyncratic nature of gestures (from McNeill 1992). Both speakers are describing a scene in a cartoon in which Sylvester the cat climbs up through a drainpipe in an effort to catch Tweety Bird. As in (5), the meaning of these gestures is only interpretable with respect to the accompanying speech, and the 'parts' of the gesture (e.g., handshape and motion) do not have meanings that are independent of the gesture as a whole.

(6) and he goes [up through] the pipe this time
Hand rises up in basket-like shape, depicting the character rising up and the interiority of the pipe

(7) he tries [climbing] up the rain barrel
Hand flexes backwards, showing the character rising upwards

Types of gesture

Examples (5)–(7) are iconic gestures which display concrete aspects of a scene described in speech. Similarly, signs are also very often iconic, i.e., some aspect of their physical form bears a resemblance to their referent. Iconicity is more prevalent than earlier researchers acknowledged (see Taub (1997) for an excellent analysis of the role of iconicity in both spoken and signed languages). Gestures can also be metaphoric; in these cases, the gesture represents an 'image' of abstract concepts and relationships that refer to the discourse metastructure. Figure 8.5 is an example from McNeill (1992) in which the speaker refers to a transition in the film he is retelling:

(8) and now [we get] into the story proper
Hands supporting an object (conduit image) rotate (three times) and move forwards (spatial image).

Fig. 8.5 Illustration of the abstract gesture in (8). Reproduced, with permission, from McNeill, D. (1992). *Hand and mind. What gestures reveal about thought.* Copyright The University of Chicago Press, Chicago, Illinois.

Fig. 8.6 Illustration of the beat gesture in example (9). Reproduced, with permission, from McNeill, D. (1992). *Hand and mind. What gestures reveal about thought.* Copyright The University of Chicago Press, Chicago, Illinois.

McNeill analyses this gesture as a metaphoric gesture for transition or process. The gesture also contains a conduit metaphor in which the concept of the film is represented gesturally as a bounded container. The forward motion of the gesture represents the concept of entering, and the rotation indicates transition and change. The gesture *in toto* conveys an image of the transition into the main part of the film. Signs can also convey metaphoric images of abstract concepts (see particularly Wilcox (1993) and Taub (1997)), and there may be some interesting parallels between metaphoric gestures and the nature of metaphor in sign language (for example, certain abstract concepts can be represented as containers using classifier constructions).

Another type of gesture that can accompany speech is called a 'beat' or a 'baton'. Unlike iconic and metaphoric gestures, beats tend to have the same form regardless of the speech content. The typical beat is a quick flick of the hand or fingers up and down, or back and forth. Beats mark the accompanying word or phrase as significant for its discourse-pragmatic content, rather than for its semantic content (McNeill 1992). Figure 8.6 provides an illustration from McNeill (1992):

(9) when[ever she] looks at him he tries to make monkey noises
     Hand rises short way up from lap and drops back down.

In this example, the speaker is referring to the theme of an episode, and not to a particular event, as indicated by his use of the word 'whenever'. The beat gesture is associated with this word, emphasizing its metanarrative function of summarizing (i.e., the speaker is not narrating a chain of events, but summarizing a set of events). Beats tend to be associated with metanarrative functions such as introducing new characters, summarizing actions, introducing new themes, and signalling changes in narrative structure. There does not appear to be a clear parallel between beat gestures and signs (although of course, signs, like words, convey metanarrative information).

A final type of gesture that accompanies speech can be categorized as deictic.

Deictic gestures are pointing gestures that function to indicate objects or events in the physical environment surrounding the speaker. However, deictic gestures can also be abstract, for example, pointing to a location in gesture space that stands for an abstract concept or relationship described in speech (McNeill 1992). There is no doubt that pointing signs have deictic functions, and later we will examine the distinction between pronominal deixis and gestural deixis in our discussion of whether signers gesture.

Co-expressive synchronous timing

Gestures are integrated into the accompanying speech, and almost all gestures (around 90%) occur when the person is actually speaking (McNeill 1985). Gestures are rarely produced by listeners. The 'stroke' phase of a gesture expresses the meaning of the gesture and is synchronized with the linguistic elements that are co-expressive with it (Kendon 1980). The gesture and the speech are co-expressive in the sense that they both refer to the same referent (i.e., the same event, object, relation, etc.)—gesture and speech form a composite expression (see Clark 1996). The brackets in the above examples indicate the speech co-occurring with the stroke of the gesture. Gesture preparation (e.g., the hand rises up into 'gesture space') can precede speech and is optional, but the stroke is obligatory and timed to occur at the same time as the prosodic stress peak of the associated utterance (McNeill 1992). The gesture stroke never follows the related speech. Of course, the articulation of signs is not timed to coincide with a structural element of a separate co-expressive system.

Function

The extent to which sign language is communicative has never been questioned; however, the extent to which the gestures that accompany speech are communicative is a topic of much debate. Some researchers argue that the primary function of gesture is to convey information to the addressee (e.g., Cohen 1977; Kendon 1983). Others argue that the primary function of gesture is to facilitate lexical retrieval (Rauscher *et al.* 1996; see also Chapter 6, this volume), while still others suggest that gestures are linked to speech hesitations and repair (Butterworth and Beattie 1978).

In particular, Krauss and colleagues question the communicative function of gestures that co-occur with speech (Krauss *et al.* 1991, 1995). Krauss *et al.* (1995) point out that even though people gesture more when they are face-to-face, speakers nonetheless produce gestures when they cannot be seen by their addressee, e.g., when speaking on the telephone or through an intercom. Such gestures cannot perform a communicative function since they cannot be seen. In addition, there appears to be only weak evidence that preventing gesture impairs communicative success, and the ability to see a speaker's gestures does not appear to enhance comprehension by an addressee (Krauss *et al.* 1995). Therefore, Krauss and colleagues have concluded that the primary function of gestures is to facilitate

speech production. Evidence for this hypothesis stems from the effect of preventing gesture on speech and from the temporal relation of gesture to speech. The initiation of gestures almost always precedes the word associated with that gesture (its 'lexical affiliate'), and such temporal coincidence would be necessary if gesture production is to aid word retrieval (Morrel-Samuels and Krauss 1992). In addition, preventing gestures and creating word finding difficulties by forcing subjects to use constrained speech both lead to the same types of speech dysfluencies, suggesting that the prevention of gesture leads to difficulties in lexical retrieval (Krauss *et al.* 1995). Obviously, signs *are* lexical items and do not facilitate the production of another communicative channel.

Clark (1996) argues that although gestures may be facilitative, their main function is in fact communicative. Clark suggests that iconic gestures are either component or concurrent gestures. Component gestures are embedded as part of the utterance, and are patently communicative. For example: 'The boy went [rude gesture] and ran away.' However, these are not the gestures that concern Krauss and colleagues. Concurrent gestures, on the other hand, are produced at the same time as the speech utterance. Clark argues that these gestures often convey information that is not present in the speech and that this information is in fact informative. For example, Engle (1998) finds that when explaining how locks work, speakers often produce gestures that convey information related to but not present in the accompanying speech. Clark suggests that the facilitative role of gestures may be an epiphenomenon of their communicative function.

Finally, McNeill (1992) suggests that gestures are not only an act of communication, but also an act of thought. He argues that gestures occur because of the speaker's ongoing thought process—thought is not worked out and then translated into speech and gesture; rather, words and gestures arise from a shared computational stage that precedes articulation. McNeill argues that spontaneous gestures reflect the early 'primitive' stage of an utterance, in which one dimension of thought is a global-synthetic image. In contrast, words reflect the final stage of the utterance and are governed by linguistic structure. McNeill (1993, p.156) writes:

one supposes that for the deaf and others who make use of conventional sign languages the primitive stages of their sentences also include global-synthetic images, just as in the case of spoken languages, but their signs, unlike the spontaneous gestures of the hearing, do not, cannot, reflect this stage. The kinesic–visual medium is grammatical and socially regulated for the deaf, and this shifts the overt performance of deaf signers to the final stage of the internal temporal evolution of utterances.

Thus, according to McNeill, signs cannot reflect the early imagistic aspects of thought in the way that gestures do.

Do signers gesture?

After laying out the differences between sign language and the gestures that speakers use when they talk, we are in a position to tackle the question 'Do signers

gesture?' I suggest the answer is 'Yes, but not the way speakers do.' The major difference is that signers do not produce idiosyncratic, spontaneous movements of the hands and arms while they are signing. The constraint on such movements is fairly obvious: Both hands are involved in producing the linguistic utterance, and constraints on bimanual coordination and motor resources prevent the production of a lexical sign with one hand and the production of a holistic non-linguistic gesture with the other.

Manual gestures

However, I will argue that signers do produce *component* gestures, to use Clark's terminology (Liddell and Metzger (1998) describe such gestures as 'constructed action'). Such manual gestures are produced as a separate component of a signed utterance, and signers stop signing while they produce the gesture. Figure 8.7 provides an illustration in which the signer (B.D.) produces a sign (RUN), holds the sign with the dominant hand, and produces a gesture meaning something like 'stop' (the left hand waves towards the location of an antagonist), and then returns to the sign. The signer in Fig. 8.7 is retelling a scene from the *Frog, where are you?* story (Mayer 1969).[2] The images in the following ASL figures are video frames from the signer's actual narration. In the scene described, a dog is running along side a deer who is carrying away the boy to whom the dog belongs. In the following examples, gestures are described in lower case and bracketed by back slashes (see note 1 pp. 158–159 for other conventions used here).

(10) #DOG CL:RUN_[hooked V hs]/hand waves towards location of deer/
        CL:RUN_[hooked V hs]
        'The dog is running (gestures 'stop') and running.'

| #DOG | CL:RUN | /stop/ | CL:RUN |

Fig. 8.7 Illustration of the signs and gesture in example (10).

Manual gestures may also be strung together, as in the example shown in Fig. 8.8. In this example, the signer is describing a scene in the 'Frog' story in which the boy peers over a log, sees a group of baby frogs, and gestures to the dog to be quiet and come over to the log. The sequence is purely gestural with no hierarchical or componential structure.
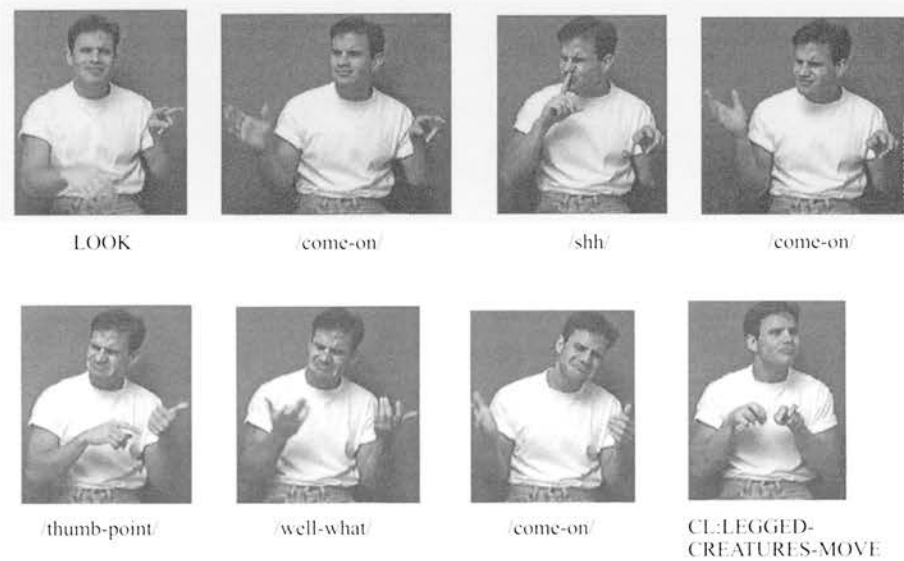
LOOK   /come-on/   /shh/   /come-on/

/thumb-point/   /well-what/   /come-on/   CL:LEGGED-
                                                      CREATURES-MOVE

Fig. 8.8 Illustration of the signs and gestures in example (11).

(11) LOOK/come-on, shh, come-on, thumb-point, well what?, come-on/
      CL:TWO-LEGGED-CREATURES-MOVE[hooked V hs]
      'Look over here. (gesture: come-on, shh, come-on, thumb-point, well
      what?, come-on). The two crept over (to the log).'

Notice that the signs RUN and LOOK in examples (10) and (11) remain
loosely articulated on one hand while the signer produces the gesture with the
other hand. This is as close as one gets to simultaneous gesture and signing.
However, such examples differ crucially from concurrent speech and gesture
because, although co-temporal, the signs and gesture are not co-expressive. That
is, the sign LOOK does not refer to the same referent as the 'come-on' or 'shh'
gesture. In addition, LOOK was not initially produced at the same time as the
gesture; rather, LOOK was first signed and then maintained while the gestures
were produced.

Examples (12)–(15) below provide further illustrations of gestures alternating
with signs. As with examples (10) and (11), the gestures do not appear to have
lexical affiliates, i.e., specific signs with which the gesture is associated.

The following examples are from a signer (S.S.) telling James Thurber's
'Unicorn' story (Thurber 1940):

(12) CL: RUN[two-handed body-part classifier, 1 hs]/taps as if to wake imagined body/WIFE
      THAT_a/taps repeatedly at location a/
      'He ran' (gesture: taps location where wife is sleeping). 'His wife is there'
      (gesture: taps imagined body more vigorously).

(13) CL: KNEEL-ON-SURFACE_[hooked V hs on flat B hs]/rests head on his hand/
'He knelt down' (gesture: head rests on his hand and his face has a
contemplative expression).

Examples (14) and (15) are from another signer (O.C.) telling the 'Frog' story:

(14) BOY/hands fly upward, palms out, as if losing his balance/CL:FALL-FROM-
TREE_[V hs moves down from l hs]
'The boy (gesture: loses balance, falling backward) fell out of the tree.'

                                       _____wh

(15) CL: HOLD-OBJECT-WITH-FISTS_[both hands with S hs] WHERE /flat hand to
forehead as if searching/
'(The boy) holds onto something (branches). 'Where (is the frog)?'
(gesture: searching)'

The meanings of these manual gestures tend to be fairly clear even outside of
the sign context, and this is true for the majority of manual gestures that occur in
alternation with signing. In contrast, the gestures of speakers are generally un-
interpretable without the accompanying speech (Krauss *et al.* 1991). The manual
gestures that occur with signing tend to be more mimetic and conventional than
the gestures that are concurrent with speech.

In fact, it is not a simple matter to determine whether a given manual ex-
pression is a gesture or a sign. This question arises primarily with respect to the
possibility that a potential gesture may be an ASL classifier predicate—the lexical
status of signs such as APPLE (see Fig. 8.1) are not questioned. Marschark (1994)
seems to suggest that if a manual expression looks the same as a gesture produced
by a speaker, then that expression can be considered gesticulation rather than
signing. He provides the following as an example of gesticulation and signing
(p. 213): 'a deaf child tracing the shape of a suspension bridge after signing 'I SAW
BRIDGE THERE'.' However, it is quite possible that this expression was an ASL
tracing construction. Unlike a tracing gesture, the ASL construction is subject to
linguistic constraints. For example, 'the tracing movement always starts with both
hands together in one place; then one hand moves away in one direction, or both
hands move in opposite directions' (for a symmetrical object) (Supalla 1982).
When only one hand moves, it must be the dominant hand, and handshape
specifies the nature of the object traced, e.g., an 'I' handshape for an outline, a 'G'
handshape for a thick line, or a 'B' handshape for a surface; further constraints
apply to the nature of contact between the two hands and the morphological
status of the handshapes (see Emmorey and Casey 1995). The deaf child may have
produced such a construction, a gesture that had the same form, or an incorrect
attempt at the ASL tracing construction (e.g., deleting the non-dominant 'anchor'
hand).

Thus, particularly for children, it may be difficult to determine whether a given
manual expression is truly a holistic, non-linguistic gesture or a morphologically
complex classifier predicate. Such ambiguity is particularly prevalent for 'instru-
ment' classifier handshapes in which the handshape indicates how the human

hand holds an object (as in example (15)). A possible parallel ambiguity in spoken language might occur between an onomatopoetic word and a 'vocal gesture,' e.g., an imitation of a sound such as a barking dog or a clanking automobile. Is the expression a word or a vocal demonstration of a sound?

In sum, unlike the manual gestures of speakers, the gestures of signers occur in alternation with the linguistic signal (rather than concurrently with it), and signers' gestures tend to be more conventional and mimetic, rather than idio-syncratic. I would predict that if viewers were shown signers' gestures in isolation from the surrounding signs, they would be much more accurate in interpreting their semantic characteristics than would viewers shown gestures in isolation from speech. Finally, signers' manual gestures are not synchronized to co-occur with a particular sign related to the gesture's meaning; rather, these gestures can function as components of an utterance or as an independent expression.

Deictic pointing gestures

Pointing gestures look pretty much like ASL indexical pronouns: the index finger points towards a person, object, or location in the real world or towards a location in gesture/signing space. What is the difference? In ASL, the pointing sign (i.e., the 'I' handshape) is part of an intricate system in which handshape distinguishes case (e.g., reflexive, possessive, or indexical), orientation distinguishes person (first or non-first), and movement indicates number (plural or singular). Pronouns can be directed towards locations in signing space to refer to nominals associated with those locations. We will return to this type of pronoun in our discussion of gesture and signing space. Pronouns can also be directed towards physically present people or objects, and of course, signers also use non-linguistic pointing gestures. How can one tell the difference between a pronoun and a gestural point?

One possibility is that there is an articulatory distinction between the two forms. One of our ASL consultants suggested that pointing gestures can be distinguished from ASL deictic pronouns by subtle differences in movement. Pronouns may be characterized by a single motion towards a person or a location in space; whereas, a pointing gesture can have short repeated motions towards a person or location. Such repeated motion is judged as odd when it occurs with a form that is unambiguously an ASL deictic pronoun (e.g., the possessive 'B' handshape or the SELF pronoun directed towards a physically present person). Further research may reveal whether or not there are articulatory or rhythmic differences between pointing gestures and indexical pronouns.

Another difference is that pronouns occur in rule-governed positions within a sentence where gestures do not occur. For example, 'subject pronoun copy' is a syntactic rule in which a pronoun copy of a subject appears at the end of the clause, and it is used to add emphatic meaning (Padden 1988). The following discussion illustrates that this rule applies to deictic pronouns and not to deictic gestures.[3] In the examples below, the subscript 'Bob' indicates that the pronoun

was directed towards a person (Bob) who was physically present during the conversation.

(16) PRONOUN$_{[Bob]}$ LIKES COFFEE.
   'He (Bob) likes coffee.'

(17) /Thumb point towards Bob/LIKES COFFEE.
   '(Bob) likes coffee.'

The gesture in (17) is similar to the thumb-point gesture shown in Fig. 8.8, and is not part of the ASL pronominal system. The pointing gesture in (17) is not the subject of the sentence; rather, ASL permits null subjects in tensed clauses, particularly when the subject is clear from the discourse context (Lillo-Martin 1986). In a sense, the thumb-point gesture co-occurs with the null subject. It is possible that the form glossed as PRONOUN in (16) is actually a non-linguistic pointing gesture co-occurring with a null subject. However, examples (18) and (19) illustrate that the 'subject pronoun copy' rule applies only to ASL deictic pronouns and not to deictic gestures (question marks before an example indicate that signers find the example odd or unacceptable):

(18) PRONOUN$_{[Bob]}$ LIKES COFFEE PRONOUN$_{[Bob]}$.
   'He (Bob) likes coffee, he does.'

?? (19) /Thumb-point towards Bob/LIKES COFFEE/thumb-point towards Bob/.

The main point here is that signers produce both pointing gestures and pronouns that are directed towards physically present people or objects. Although these forms may look identical, only the pronouns are part of a syntactic representation, governed by linguistic rules and constraints of the sort that do not apply to gesture (for example, the 'pronoun copy' rule is subject to the syntactic island constraints mentioned earlier).

Body gestures

Thus far, we have focused our discussion on manual gestures that accompany speech, but the face, body, and voice can also be gestural. Clark and Gerrig (1990, p.782) provide the following example of a component body gesture which completes an utterance:

(20) I got out of the car, and I just [demonstration of turning around and bumping his head on an invisible telephone pole].

Examples (21) and (22) provide illustrations of body gestures that are concurrent with signing, rather than components of the signed utterance (brackets mark the extent of the gesture during signing):
From signer S.S. telling the 'Unicorn' story:

(21) [CL: SIT-ON-SURFACE$_{[hooked V hs on loose U hs]}$ ROCK-IN-ROCKING-CHAIR. HUSBAND WONDER REALLY HAPPY FINISH] FROM-NOW-ON

Body rocks back and forth as if in a rocking chair
'He sits and rocks in his rocking chair. The husband thinks back. I'm really happy it's all over for good.'

From signer P.C. telling the 'Cinderella' story:

(22) DECIDE DANCE. [DANCE^{+++}] THEN GIRL THINK, 'I MUST GO HOME, I MUST GO HOME.'
Body sways as if to music.
'They decide to dance. They dance all around, and then the girl realizes, 'I must go home, I must go home.''

These body motions (e.g., rocking or swaying) are not linguistic. That is, they are not grammaticized movements like the inflections shown in Fig. 8.3, and they are not part of the phonologically specified movement of the signs with which they co-occur. Unlike manual gestures, body gestures can be expressed simultaneously with signing. Body gestures express how referents move their bodies during the action described by the concurrent signing. The duration of the body motion does not necessarily correspond to the actual duration of the referent's motion, e.g., in example (22), the girl is still dancing while thinking 'I must go home', but the signer does not sway during the quotation. Finally, body gestures can also co-occur with manual gestures which alternate with ASL. For example, in (14) the signer's body moves backwards along with the manual gesture indicating a loss of balance.

Facial gestures

Although most research has focused on manual gestures, speakers (and signers) also produce facial gestures. Chovil (1991/1992, p.177) provides the following example in which a facial gesture is used for emphasis:

(23) This is [really] silly.
Raises eyebrows

Example (24) below from Chovil (1991/1992, p.180) illustrates a 'personal reaction display' in which the speaker conveys information about an emotion or an evaluation about something said. In this example, the speaker is talking about how her son's constant questioning could irritate her. In example (25), the speaker produces a facial expression that conveys dislike (from Chovil 1991/1992, p.184).

(24) . . . Sometimes I find them amusing, other times I find them [exasperating].
Raises her eyebrows; widens and rolls her eyes.

(25) [Basic steamed white rice]
Squints her eyes and wrinkles her nose.

ASL signers also produce such facial gestures. However, it is important to distinguish between affective or evaluative expressions and grammatical facial expressions. Linguistic and affective facial expressions differ in their scope and timing and in the facial muscles that are used (Reilly *et al.* 1990a,b). Grammatical

facial expressions have a clear onset and offset, and they are coordinated with specific constituent structures. Affective or attitudinal expressions have more global and inconsistent onset and offset patterns, and they are not timed to co-occur with specific signs or constituents. Examples of linguistic facial expressions include marking for adverbials, topics (examples (2)–(4)), 'wh' questions (example (15)), conditionals, rhetorical questions (example (26) below), and relative clauses (Liddell 1980; Baker-Shenk 1983). Linguistic facial expressions are phrasal morphemes that mark lexical and syntactic structures.

In contrast, affective and evaluative facial expressions are not morphemic and convey information about emotion or attitude (Liddell 1980). Example (26) is from a lecture on sign language aphasia in which the signer (N.F.) describes how a person might come to be brain damaged. The facial expression that co-occurs with her signing conveys compassion or sympathy. To be consistent with the treatment of affective facial expressions as a type of gesture, the extent of the facial expression will be marked with brackets, and the expression itself will be described in italics. This transcription method also serves to clearly distinguish between affective and grammatical facial expressions.

         ____rh-q
(26) HOW? [CAN B-E STROKE. CAN B-E CAR ACCIDENT. DIFFERENT^{+++}]
REASON INDEX-ORDINAL-TIP-LOCI.
Mouth turns down slightly, compassionate expression
'How (can it happen)? It can be a stroke. It can be a car accident. There are many different reasons.'

When describing the actions of a character in a story, a sign narrator can portray the facial expression, eye gaze, or head and body movements of the character performing the actions they describe (Liddell 1980; Engberg-Pedersen 1993). For example, in Fig. 8.7, the signer's head and face portray the dog looking up at the deer and barking. Figure 8.9 and example (27) provide another example from signer O.C. who is describing a scene in the 'Frog' story in which a beehive falls from a tree, and the bees swarm out and chase the dog.

(27) LARGE-ROUND-OBJECT-FALLS$_{[2\ hands\ with\ C\ hs]}$. [CL:SWARM. MAD.]
Eyes squint, angry expression
[#DOG CL:RUN$_{[hooked\ V\ hs]}$.]
Tongue out, fearful expression
[BEE CL:SWARM-MOVES]
Eyes squint, angry expression
'The beehive fell to the ground. The bees swarmed out. They were mad. The dog ran away, and the bees chased him.'

In example (27), the signer rapidly alternates between a facial expression that depicts the anger of the bees and one that depicts the fear of the dog. The sentences in (27) are examples of what sign linguists term 'referential shift' or role shift (e.g., Padden 1986). Referential shift is indicated by a break in eyegaze with

Fig. 8.9 Illustration of the signs in example (27).

the addressee, a shift in head and body position, and a change in facial expression (only the break in eyegaze is obligatory). A referential shift indicates that the following discourse should be understood from the point of view of the referent associated with the shift. In (27), the facial expressions produced by the signer are understood as reflecting the attitude of the bees or the dog—the signer herself is neither angry nor afraid. Referential shift is a linguistic device that can disambiguate the point of view associated with a facial expression, but the facial expression itself is non-linguistic.

Some researchers have suggested that during a referential shift, signers systematically use a facial expression or posture that uniquely identifies the character associated with the shift (Loew *et al.* 1997). However, although skilled story-tellers might use caricatures that identify a specific character (e.g., a sneer for an evil person), such caricatures are not the norm.[4] Rather, ordinary signers produce facial expressions that depict selective aspects of what someone or something did or said—they are demonstrations in the sense of Clark and Gerrig (1990). That is, these facial expressions are not set 'character expressions', but serve to illustrate the current emotion or attitude of the character whose actions, thoughts, or words, are being described by the narrator (the person signing).

Facial gestures do not necessarily illustrate only an emotional state or evaluation. In example (27), the signer sticks her tongue out slightly when describing the dog running. This aspect of her facial gesture depicts the panting of the dog rather than an emotion. In example (28), signer S.S. depicts the mouth movements of a hearing person on the phone (the wife in the 'Unicorn' story):

(28) [PHONE-TO-EAR]
   Mouths unintelligible words with an angry expression
   'She spoke angrily into the phone.'

Although English speakers produce affective facial expressions and other facial gestures during narratives, they do so much less frequently than ASL signers. Provine and Reilly (1992) found that English speaking mothers produced significantly fewer affective facial expressions than signing mothers when telling the same story to their children. Instead of using their face, speakers rely more heavily on intonation and voice quality to convey affective and evaluative information. Furthermore, just as speakers vary in their tendency to use their voice to depict different characters or to convey affective information, signers vary in the extent to which they use affective facial expressions. However, signers do not vary in their use of obligatory grammatical facial expressions.

Gesture versus signing space

ASL, and other signed languages, have classes of signs which can be directed towards locations within signing space (e.g., pronominals, spatial verbs, indicating (agreement) verbs, and classifier predicates). For example, the sign LOOK in example (11), Fig. 8.8, is directed towards the location associated with the baby frogs, and the classifier predicate glossed as SWARM-MOVES in example (27) moves from the location associated with the beehive towards the location associated with the dog. In a series of recent papers, Liddell (1994, 1995, 1996, in press) has argued that such locations in signing space are not morphemic or part of the syntactic representation of the sentence. Liddell observes that when signs are directed towards physically present people or objects (such as the pronouns in examples (16) and (18)), the direction of motion is not lexically fixed, but depends upon the actual location of the referent ('Bob' in our examples). Since a referent can be in an unlimited number of physical locations, there are no linguistic features or discrete morphemes that can specify the direction of the sign. Liddell argues that the same is true for signing space: there are an unlimited number of locations in signing space towards which a pronoun (or other sign which 'uses space') can be directed. Furthermore, just as 'Bob' in examples (16) and (18) is not part of the syntactic representation of the sentence, Liddell argues that the locations within signing space are similarly not syntactic. Thus, reference is deictic, rather than anaphoric, for both physically present and non-present referents.

Liddell (in press) proposes that these types of signs (i.e., pronominals, agreeing verbs, etc.) are combinations (blends) of linguistic and gestural elements. He writes,

The handshapes, certain aspects of the orientation of the hand and types of movement are all describable by discrete linguistic features. The direction and goal of the movement constitute a gestural component of the sign.

Liddell (in press), p.17

Spoken utterances can also exhibit a composite of linguistic and gestural elements, but it is easy to distinguish between the linguistic signal and deictic gesture because they occur in different modalities. In addition, the gestural component does not influence the form of individual spoken words as it does for signed languages. Liddell (in press, p.26) explains that

the one difference [he is] proposing between signed languages and spoken languages, is that signed languages have all developed in ways which allow the gestural component to combine with the linguistically specified features of some classes of signs without interfering with the ability to recognize the signs themselves.

Both speakers and signers produce utterances that combine words concurrently with gestures; but for signed languages the deictic gesture is superimposed on the word and thus alters its form, since the word and gesture are in the same modality.

If Liddell is correct, then signing space is gesture space.[3] Furthermore, Liddell's proposal suggests that signers are constantly producing signs with a gestural component—the signs relevant to his proposal are extremely common and pervade the language. The analogous deictic gestures of speakers are much rarer. Under this proposal, signers must rapidly and frequently integrate linguistic representations with non-categorical representations of spatial locations (i.e., where the hands are directed in signing or real space). Thus, for sign languages there may be a very intimate connection between linguistic structures and non-linguistic representations of spatial relations (see also Emmorey 1996). Listeners must also be able to integrate linguistic representations and spatial information conveyed by the gesture of a speaker, but such integration is not an integral part of comprehension. That is, speech is quite comprehensible even when gestures cannot be seen, but sign language comprehension *requires* the interpretation of the gestural component.

Function

Do gestures perform the same function for signers that they do for speakers? It seems unlikely that the manual, body, or facial gestures produced by signers function to facilitate lexical access. These gestures are not tied to a particular lexical item, and the body and facial gestures do not have the spatiodynamic features that would be needed to prime an associated lexical representation. Signers simply do not produce the type of gesture that has been purported to aid lexical retrieval, namely, manual gestures concurrent with (or slightly preceding) associated lexical signs.

Signers' gestures certainly appear to be communicative. For the most part, the gestures presented here depict how someone's hands or body move during an event described by the signer. Further research may reveal other types of manual and body gestures. In particular, it seems likely that signers produce interactive gestures during conversations. Bavelas and her colleagues describe a type of

gesture which makes reference to the interlocutor, rather than to the topic of the discourse (Bavelas *et al.* 1992, 1995). For example, interactive gestures help coordinate turn-taking during a dialogue. Speakers may gesturally transfer a turn by producing a gesture towards the addressee (often with the palm up, a type of 'giving' gesture) or may take the turn by producing a gesture towards themselves (Bavelas *et al.* 1995). Similarly, signers produce a well-known waving gesture which can be used to request a turn within a conversation: the open hand (palm down) is directed towards the interlocutor and the wrist oscillates up and down. This gesture indicates a desire for the floor (it is also used generally as a gesture to gain attention.) Further research may reveal other manual and non-manual interactive gestures. Eyegaze and head motions are particularly good candidates for non-manual gestures that may perform some of the interactive functions which Bavelas has uncovered for the manual gestures of speakers.

As noted earlier, speakers produce gestures even when they cannot be seen by their addressee. This phenomenon has been taken as evidence that gestures perform a cognitive function, as well as a communicative one. McNeill (1992, p.109) suggests that gestures reveal

aspects of [the speaker's] inner mental processes and points of view towards events when these are not articulated in speech. In gestures we are able to see the imagistic form of the speaker's sentences. This imagistic form is not usually meant for public view, and the speaker him- or herself may be unaware of it or think that it has been well hidden, but it is visible to those who would look at the gestures.

Are the gestures of signers similarly revealing? Elisabeth Engberg-Pedersen (personal communication) provides an anecdote which suggests that they may be, if the use of signing space is taken to be gestural. Engberg-Pederson videotaped a signer describing a yearly meeting of the National Association of the Deaf. The signer indicated that normally only the same group of people came to these meetings, but that particular year was quite different, and many ordinary deaf people attended. When Engberg-Pederson showed this tape to a group of deaf people, they started laughing at this point. When she asked them why, they said that the signer had revealed her true opinion about these 'ordinary deaf people' by using a very low spatial location for them. In this example, signing space carried meaning beyond the association between a referent and a location in space. The use of a low spatial location reflected the general cognitive metaphor 'high status is up and low status is down' (Lakoff and Johnson 1980). In this example, the signer's 'unwitting' use of space revealed her inner thoughts.

To conclude, signers do gesture, but not in the same way that speakers do. Signers do not produce spontaneous idiosyncratic hand gestures that are concurrent with signing. However, they frequently produce facial and body gestures that are articulated simultaneously with signing (particularly during narratives). Signers produce manual gestures that alternate with signing, and these gestures are often iconic and can be metaphoric, e.g., the 'well-what' gesture in example (11), Fig. 8.8, is an abstract gesture in which information (what can be seen

behind the log) is supported by the hands (the conduit metaphor). The manual gestures of signers differ from those of speakers in that they tend to be more conventional, are not tied to a particular lexical sign, and have different timing properties. Signers also do not produce manual beat gestures, although it is possible that such gestures are produced non-manually. The gesture space of signers may be much richer than that of speakers, particularly if Liddell's hypothesis is correct. Finally, the gestures of signers perform some, but not all, of the functions that have been proposed for the gestures of speakers.

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Notes

1. Words in capital letters represent English glosses for ASL signs. Multiword glosses connected by hyphens are used when more than one English word is required to translate a single sign. Gestures that occur in alternation with signs are described in lowercase and bracketed by backslashes. A subscript word(s) following a sign gloss indicates a morphological inflection. Letter subscripts indicate specific locations in

signing space. A superscript '+++' indicates repetition. A # sign indicates a fingerspelled loan sign. A line above a sign(s) indicates the scope of the facial expression named at the end of the line. Classifier forms are abbreviated with CL, and a description of the classifier form may be given as a bracketed subscript (hs stands for 'handshape'). English glosses are given in quotations.

2. The 'Frog' stories by signers B.D. and O.C. were collected by Judy Reilly.
3. Examples (16)–(19) were worked out in collaboration with Edward Klima.
4. This point was brought to my attention by Judy Reilly.
5. Gesture space excludes location distinctions that are specified in the lexicon. Liddell (in press) notes that the signs POINT and GOAL are the only ASL signs distinguished by where they are articulated within signing space. Such location distinctions would be specified lexically and would not constitute a gestural use of signing space.