# 9

# Sources of Meaning in ASL Classifier Predicates[1]

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Verbs capable of being directed in space were initially called *directional verbs* (Fischer & Gough, 1978) or *multidirectional verbs* (Friedman, 1976). By the mid-1970s, ASL researchers had identified a category of signs with characteristics that appeared to distinguish them from other directional signs. Identifying this class of signs was the first attempt at subdividing the class of directional verbs. The signs in this class were said to share the distinctive characteristic that each is produced with a meaningful handshape representing some entity. In addition, for many classifier predicates, the movement of the hand describes the movement of the entity represented by the hand. Frishberg (1975) describes these handshapes as being "… in particular orientations to stand for certain semantic features of noun arguments" (p. 715). This class of signs came to be called *classifier predicates* (Liddell, 1977) or *verbs of motion and location* (Supalla, 1978). The sign in Fig. 9.1 is an example of the type of sign Frishberg (1975) describes as being produced with a classifier handshape.
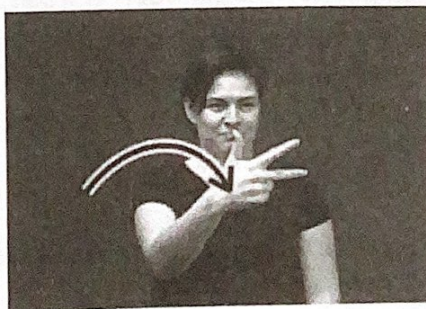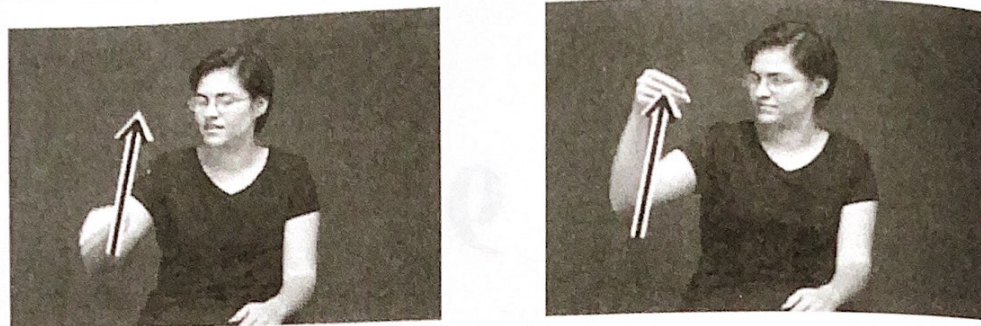


FIG. 9.1. VEHICLE-MOVE-TO.

FIG. 9.2.  HAND-PICK-UP-FLAT-THIN-ENTITY.

Most analysts would treat the handshape in this sign as a vehicle classifier. However, Baker and Cokely (1980) describe oriented handshapes, rather than handshapes alone, as carrying the meaning. The sign in Fig. 9.1 could be used to describe the movement of various types of vehicles from a clear starting point $A$ to a destination $B$. The vehicle being described could be a car, a bicycle, a boat, or a motorcycle. Thus, the handshape does not signify any specific kind of vehicle, but rather, appears to be used to describe the movement or placement of any member of a class of vehicles, hence the term *classifier*.[2] For the purposes of this chapter, I will use the term *classifier predicate* to label the verbs discussed. I am using this term simply as a convenient label to identify a member of this class of verbs.

Initially, no distinctions were made with respect to the significance of the directionality of classifier predicates and other directional verbs. The first attempt at separating out different functions of directionality was based on how the directional movement of signs is interpreted. The directionality of verbs of motion and location has a gradient, locative significance whereas the directionality of indicating/agreement verbs serves to identify entities corresponding to subjects and objects (Liddell, 1980).

Mandel (1977) uses the term *marker* rather than classifier and includes a description of the significance of location and motion in his definition of markers: "An articulator used in a construct so as to be locatively iconic of an object, so that its behavior and situation in the signing space (whether stationary or moving) represent those of the object" (Mandel, 1977, p. 95).[3] The verb HAND-PICK-UP-FLAT-THIN-ENTITY in Fig. 9.2 is also considered to be a classifier predicate, although it describes the handling of an entity rather than directly representing the entity itself (Boyes-Braem, 1981; McDonald, 1982; Schick, 1980; Supalla, 1982).

The second photo shows the signer gazing at the invisible entity being held. The hand configuration does not represent that entity, but rather, represents the hand holding that entity. In producing this verb the signer is not copying the handshape used in the actual event being described; rather, the handshape in this verb is fixed. This makes it like the handshape in Fig. 9.1, which is also lexically fixed. This handshape is highly iconic because the handshape producing this verb signifies a hand.

In addition to the meaningful aspects of the sign discussed above, the locations and orientations of the hands are meaningfully tied to the locations and orientations of the entities being described. The verb VEHICLE-BE-AT in Fig. 9.3 represents yet another type of classifier predicate.[4] It is produced with a small downward movement followed by a hold. This sign predicates the presence of a vehicle at a place.

Still another type of classifier predicate describes the size, shape, or extent of entities (Klima & Bellugi, 1979; McDonald, 1982, Supalla, 1982). In Fig. 9.4, for example, the verb,
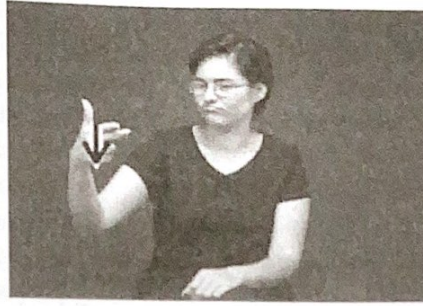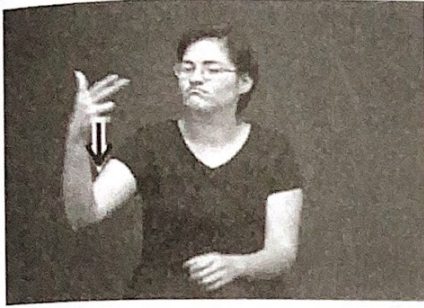
FIG. 9.3. VEHICLE-BE-AT.

FIG. 9.4. BUMPY-BROAD-SURFACE-EXTEND-TO.

BUMPY-BROAD-SURFACE-EXTEND-TO describes a bumpy surface. As in the previous examples, the handshapes are meaningful. Each of the flat B-handshapes represents a broad surface (Supalla, 1982). Through a continuous rotating oscillation of the wrist, the signer produces an undulating movement. In this particular case, the wavy up and down movement of the hand depicts a bumpy surface. The meaningful handshape tells us that the bumpy surface is broad. Signs in which the movement describes a shape are commonly produced with one stationary hand and a moving hand depicting a shape.

There was no attempt to produce a listing of every possible classifier predicate. Instead, ways were sought to provide a productive means of accounting for all possible signs of this type rather than storing each one as a lexical entry. In the late 1970s, two diametrically opposed views of how to do this emerged. DeMatteo (1977) proposes a type of underlying form in which visual imagery rather than morphemes determines the meaning. Supalla (1978, 1982, 1986) provides an alternate model in which classifier predicates are composed entirely of morphemes, and in which visual imagery plays no role whatsoever. Below I examine these two diametrically opposed analyses.

## VISUAL IMAGERY AS THE SOURCE OF MEANING

DeMatteo (1977) proposes that visual imagery is significant in ASL. This is especially true in his treatment of classifier predicates. He notes that the types of abstract linguistic representations proposed by linguists as underlying human speech are composed of a limited set of meaningful lexical elements ultimately reducible to morphemes. Sequences of such meaningful elements, structured according to the rules of combination for individual languages, are assumed to under-

lie all spoken utterances. DeMatteo claims that such morphemic representations are not appropriate in the description of classifier predicates.

The sign in Fig. 9.5 describes two people at separate locations. The signer's right hand moves in a straight path to the other hand. The intended meaning is, 'Two people were standing, facing one another. One walked over to the other.'

Here is how the imagery analysis works. One first has to imagine that each hand represents a standing person. The palm side of the hand is the front of the person and the tip of the extended finger is the top of the person's head. Simple observation of the placement of the two hands tells an addressee that the two standing people are facing one another. The handshape that moves shows which person moves. The handshape on the signer's right moves to the handshape on the signer's left. This can be understood to mean that the person represented on the signer's right moved to the person represented on the signer's left. Note the similarity of the physical description of the two hands during the production of this sign and the meanings expressed. DeMatteo's claim is that the meanings expressed are understood by watching the visible scene created by the two hands. That is, the classifier predicate in Fig. 9.5 creates, "a spatial analogue of the movement in the real/imaginal world: the function is to enable the addressee in the signed communication to reconstruct the scene in order to infer the relationships between the two actors in the event" (DeMatteo, 1977, p. 115). In this analysis, the signing space serves as a stage within which the two hands represent the two individuals and demonstrate what the two individuals did by recreating their actions in the signing space.

The addressee must view the signing as an analog reconstruction of the actual scene in which the placement and movement of the hands represent the location and movement of the referents. In this analysis, there are no morphemes meaning 'walk' or 'move'. In fact, the concept of a morpheme is irrelevant in understanding the movement of classifier predicates because no morphemic elements underlie the movement of the hands. What does underlie the movement of the hands is a mental image of the actual scene. All the movements that are part of this mental image are transformed to the scale of the signing space and represented by the properly scaled movement of the hands. DeMatteo (1977) proposes that the structure underlying ASL classifier predicates is fundamentally different from the linguistic structures found in all spoken language utterances.

DeMatteo's (1977) analysis appeared at a time when linguists were demonstrating remarkable parallels between signed and spoken language grammars. By doing so, they were amassing evidence that ASL should be treated as a real human language. Given this progress in finding linguistic structure underlying ASL utterances, DeMatteo's proposal did not receive a welcome reception. After all, his claim was that the underlying representation of a classifier predicate cannot be analyzed as one would analyze a spoken language utterance (i.e., as com-
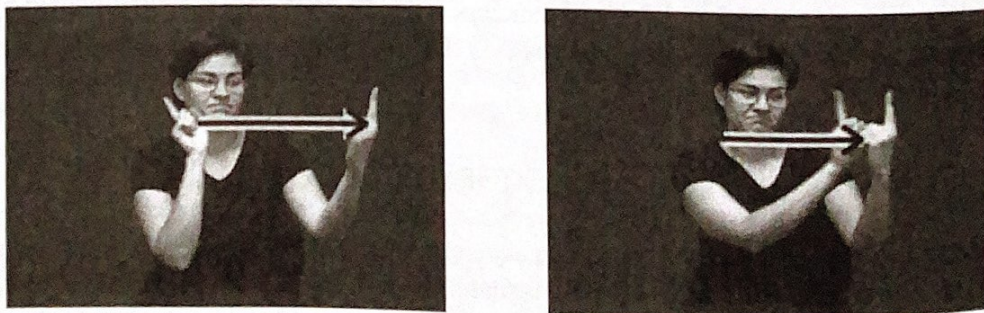


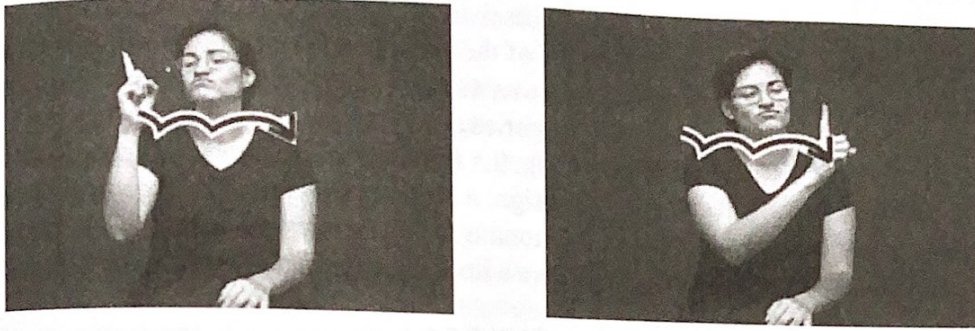FIG. 9.5. UPRIGHT-PERSON₁-WALK-TO-UPRIGHT-PERSON₂.

mm
FIG. 9.6. UPRIGHT-PERSON-WALK-ALONG.

binations of morphemes). It would follow, then, that ASL was different in an important way from spoken languages.

DeMatteo's analysis faces difficult semantic problems. For example, in Fig. 9.5, one hand moves along a straight path from its original position to contacting the other hand. The imagery analysis places the burden of figuring out how the person's movement took place on inference. There are many ways of getting from *A* to *B*. One could saunter, shuffle, walk, skip, trot, run, hop on one leg, hop with two legs, and so on. In spite of the large number of possible means of getting from *A* to *B* by foot, the sign means, 'walk from *A* to *B*'.

Now consider the sign in Fig. 9.6. The movement of this one-handed sign is similar to the movement of the moving hand in Fig. 9.5, but with the addition of repeated, up and down movements along the path.

In addition to the up and down movements, the signer is producing the 'mm' nonmanual signal, which adds the meaning, 'unhurried, relaxed, enjoyable, or not out of the ordinary' (Liddell, 1977, 1980). This nonmanual signal provides a source for the "unhurried" aspect of the meaning of this verb. What is the addressee supposed to make of the repeated up and down movements? Given the claim that this is an analog interpretation based on visual imagery, it follows that the person whose movement is being described also made repeated up and down movements. What could cause the person's body to move up and down? Hopping or trotting would certainly make the person's body move up and down along the path. Although either would be a reasonable inference based on visual imagery, both would be wrong. The sign means that the person walked unhurriedly from the original position to the final position. This is a serious problem for the imagery analysis. The *means* of getting from the starting location to the ending location in Figs. 9.5 and 9.6 are not based on inference. That is, signers do not have to figure out whether the person hopped, jumped, skipped, or walked. The person moved by walking. This appears to be a fact about the signs themselves. The claim that imagery and inference can account for the meanings expressed through verbs of motion and location leaves no room for such facts.

## MORPHEMES AS THE SOURCE OF MEANING

Supalla (1978, 1982) treats classifier predicates as highly synthetic, multimorphemic predicates. Supalla describes the signs he analyzes as verbs of motion and location. Each such verb consists of one or more movement roots, possible secondary movement and manner affixes, one

or two noun agreement markers, in some cases a body part affix, an orientation affix, affixes marking the orientation and "slantedness" of the "base plane," a placement affix, optional affixes that express the concepts *broken* and *wrecked*, and potentially relational, 'enclosure', and distance affixes. These root and affix categories are summarized in Table 9.1.[5]

We have already looked at the sign in Fig. 9.5 from the perspective of visual imagery. I now describe a morphemic analysis of the same sign. According to my best estimate, this example appears to contain four movement roots. The nonmoving hand stays in place because of a hold root. The active hand begins with a hold root, then a linear movement root, followed by another hold

**TABLE 9.1**

**Possible movement roots and affixes from Supalla (1982)**

|  | *Major Categories* | *Examples* |
|---|---|---|
| *Movement roots* | stative | linear tracing, arc tracing, circular tracing, hold |
|  | contact | linear stamping, arc stamping, circular stamping, contact |
|  | active | linear path, arc path, circular path, end pivot, mid pivot, spread bend flat, bend round, change diameter |
| *Affixes* | secondary movement: degree of change | minimum, maximum |
|  | secondary movement: directionality | unidirectional, contradirectional, bidirectional |
|  | secondary movement: frequency | single, repeated |
|  | secondary manner | hopping, random movement |
|  | size and shape specifier (themselves polymorphemic) | flat and wide, flat and narrow, etc. |
|  | semantic classifiers | vehicle, hull, freely maneuver verticle object |
|  | body classifiers | Components of the signer's body: eyes, nose, mouth, etc. |
|  | orientation of entity | upright, flat side down, edge down |
|  | orientation of base plane | horizontal, vertical, diagonal |
|  | slantedness of base plane | slant toward horizontal axis; slant toward vertical axis |
|  | placement (two such affixes establish a 'base plane') |  |
|  | condition | broken; wrecked |
|  | relational morphemes | in, at, at-top, at-side, at-bottom |
|  | 'enclosure' morphemes | inside, outside |
|  | distance | unmarked, minimum, and maximum |
| *[needed, but not mentioned in Supalla's analysis]* | facing | rightward, leftward, toward signer, etc. |

root. The weak hand hold root has at least four affixes. Where possible, I follow the name of a morpheme with a description of its form. If there is no such description, it means that Supalla's analysis does not describe the form of the morpheme. There is a semantic classifier affix signifying a freely maneuverable vertical object, represented by a 1-handshape. There is an uprightness affix expressing the meaning that the entity is in its "normal" upright position. For this classifier, uprightness is signaled by orienting the base of the hand downward.[6] There would also be a placement affix (undescribed form), and an affix signifying the direction the upright object is facing (undescribed form). There is no sequentiality involved with this root and affixes. They all combine simultaneously to form a single, nonsequential unit.

The other hand articulates several other morphemes. It begins with a hold root like the weak hand, but with some of the affixes being different. Although the semantic classifier and the uprightness affixes are the same as those on the weak hand, it begins with different place and orientation affixes (both undescribed). That is, the hand is located at a different part of the signing space and the palm is facing in a different direction. Supalla (1982) also notes that two placement affixes determine a base plane. Because the movement roots associated with each hand have placement affixes, there are two such placement affixes. Presumably, we now need to add a horizontal morpheme for the base plane (undescribed form). In addition, we need an affix marking the distance between the two entities. For our purposes, we use the unmarked distance affix (undescribed form). These last two affixes, horizontal base plane and distance between entities, would have to attach to one of the roots—but which one? The horizontal base plane would seem to be a characteristic of the entire combination, as would the distance between the two entities. There is no obvious root for the attachment of these two morphemes.

Thus, prior to the movement of the active hand, we have two movement roots and a large number of affixes. If the two morphemes ('horizontal base plane' and 'unmarked distance') are attached to only one of the roots, then there is a total of 12 morphemes prior to the movement of the hand (shown in boldface in Table 9.2). The moving hand will require an additional linear path root (straight movement), followed by a hold root. The path root will require a unidirectional affix and a single instance affix. A full description also requires a final minimum distance affix (undescribed form), signifying that the two entities are now a minimum distance apart.

For each root I attempted to estimate both the maximum and minimum number of morphemes needed in this analysis. In computing the maximum, I assume that each movement root has its own set of affixes. In computing the minimum, I counted identical repeated affixes as a single affix. Morphemes that are part of the minimum count appear in boldface in Table 9.2. The repeated morphemes are written in italic. Thus, in this morphemic analysis, the single sign in Fig. 9.5a is composed of 4 movement roots and a minimum of 14 affixes. If each root requires its own full set of affixes, then the total is much larger: 4 roots and 24 affixes.

In this analysis, the meaning expressed by this sign is fully and exclusively morphemic. That is, the meaning is derived from the meanings of the 18 or 28 morphemes described above: A nonmoving, freely moveable vertical object is upright on a horizontal surface facing in some direction, while another nonmoving freely moveable vertical object is upright on a horizontal surface facing in another direction. One object then makes a single unidirectional movement in a path toward the other resulting in a minimal distance between the two.

So far, the morphemes give no indication as to whether the two entities began facing one another. The morphemic representation only tells us that there are two entities facing in different directions. In order to account for the meaning, we might add a 'facing one another' affix to make the relationship clear. This would bring the total to four roots and either 15 or 25 affixes.

## TABLE 9.2

### The morphemes in PERSON$_1$-WALK-TO-PERSON$_2$

| | Weak hand | Strong hand | | |
| --- | --- | --- | --- | --- |
| | hold root | hold root | linear movement root | hold root |
| secondary manner | | | | |
| semantic classifiers | freely moving vertical entity | freely moving vertical entity | freely moving vertical entity | freely moving vertical entity |
| orientation of entity | upright | upright | upright | upright |
| facing | rightward | leftward | leftward | leftward |
| orientation of base plane | horizontal | horizontal | horizontal | horizontal |
| placement (two such affixes establish a 'base plane') | (placement$_a$) | (placement$_b$) | (placement$_{b-c}$) | (placement$_c$) |
| distance | | (unmarked distance) | | (minimum distance) |
| directionality | | | unidirectional | |
| repetition | | | single instance | |
| max # of morphemes; 4 roots + 24 | Root + 5 | Root + 6 | Root + 7 | Root + 6 |
| min # of morphemes: 4 roots + 14 | Root + 5 | Root + 5 | Root + 2 | Root + 2 |

This number of roots and affixes is needed because visual imagery is eliminated as a source of meaning. That is, if one looks at the two hands as entities with fronts and backs, and assumes that the palms represent the fronts of the entities, one can see that the two hands are facing one another. This source of meaning is not available in the morphemic analysis. Instead, there is an apparent need for a morphemic means of expressing that the two standing people represented in Fig. 9.5 were facing one another. I suggested that a 'facing one another' affix might be needed. However, saying that such a morpheme might be needed does not solve the problem. All I have really suggested is that because the signing expresses that the two people are facing one another, and because all meaning is assumed to come from morphemes, there must be a 'facing one another' morpheme. One possible solution would be to say that the orientation with the two palms facing one another could be the form of the morpheme. This might help with two upright entities, but what about one upright entity and one vehicle? A person could face the front of the vehicle, either side, the rear, or something in between. Two palms facing one another will not work as a general solution to the facing problem.

The guiding assumption of the morphemic analysis of classifier predicates is that all meaning is represented by means of morphemes. Once this assumption is made, there appears to be no choice other than to begin positing morphemes for all the meanings found in the sign. Supalla (1982) is explicit about this guiding assumption:

But ASL, being in the important senses an instance of a humanly possible language, has universal design features in common with all human languages. Most importantly: Human linguistic systems are digital, not analogue, a fact independent of the peripheral resources (mouth and ear, or hand and eye) that are used to create the forms. (p. 9)

Given the working assumptions of this analysis, the fact that locations are distinctive leaves no choice but to treat locations as morphemes. In Fig. 9.5, for example, each hand is placed at a morphemic location. But how many such location morphemes are there and what do they mean? In an apparent answer to this question, Supalla (1982) proposes a "base grid" system. In this system, there are limited numbers of base points which together, constitute a base grid. Fig. 9.7 illustrates six possible meanings, depending on the relationship between the movement path and the base grid.

Using the six locations in Fig. 9.7, the signer is able to express the six meanings shown. One can represent movement from, movement through, movement to, movement from beside, movement past, and movement to beside. The relationship between the movement path and the base locations determines which of these meanings is expressed. Although the total number of possible relationships between base points proposed by Supalla (1982) is very limited, this proposed restriction on relationships between base points does not address the placement of the base points themselves. Apparently, base points can be located in any of innumerable places in the signing space.

Contrary to the notion of a discrete number of locations in a base grid, it appears that signers are free to select points in the signing space guided by the actual physical relationships they are trying to depict, without having to match individual locations to a discrete number of predetermined number of spatial loci. Poizner, Klima, and Bellugi (1987) remark on the amount of detail that can be included in this type of description.

We first saw this mapping aspect of signing in its full form when a visiting deaf friend was telling us about his recent move to new quarters. For five minutes or so, he described the garden cottage in which he now lived - rooms, layout, furniture, windows, landscaping, and so forth. He described it in exquisite detail, with such explicit signing that we felt he had sculpted the entire cottage, garden, hills, trees, and all in front of us. (p. 206)

This type of intricate, detailed topographical description makes use of the three-dimensional space ahead of the signer and can in fact give the impression of the sculpting of space. It is hard to imagine that such descriptions would be possible if only a limited number of spatial loci were available for use in that description.
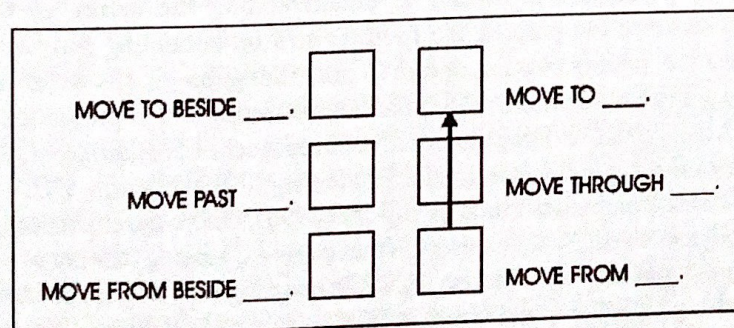


FIG. 9.7. The base grid system (Supalla, 1982).

Poizner et al. (1987) also evaluated the ability of signers with brain damage to produce spatial descriptions and found that signers with right brain lesions showed impaired ability to produce such descriptions. Their description of one patient, Sarah M., is particularly interesting. She was asked to draw her bedroom from memory and also to describe it in sign. They state that her description and her drawing "matched," although with respect to some details, the sign description was incorrect. For example, a large white dresser was "displaced to the far wall, more toward the right" (Poizner et al., 1987, p.208). In an English description of a room, we might say, "The dresser was adjacent to the right wall." If the dresser was really adjacent to the left wall, then the description could be described as deviant and the source of that deviance could be attributed to the incorrect choice of the lexical item *right* rather than the correct choice, *left*. Making decisions about the deviance of the signed description would not be based on having selected the wrong location morphemes, but on a comparison of the placement of the figures in the drawing with the physical placement of the classifier handshapes in the signing space. This strongly suggests that, with respect to location, we are dealing with a spatial, perceptual issue rather than a morphemic one.

Supalla (1982) argues that the underlying representations of ASL classifier predicates are composed solely of morphemes. Supalla's morphemic proposal depends on the existence of a finite number of morphemes that can be selected and combined in myriad ways to produce all possible classifier predicates. This search for listable morphemes proceeds in a satisfactory way when we restrict our attention to meaningful handshapes. If we attempt to list spatial loci, loci on the body, and some orientation features, we run into what appear to be insurmountable problems. Supalla's (1982) analysis depends on the existence of such finite lists of morphemes but no one has yet proposed any such lists.

Supalla (1978, 1982) proposes that individual classifier predicates are constructed from a highly productive system in which any of a large number of affixes attach to one or more movement roots to produce an unlimited number of possible classifier predicates. DeMatteo (1977) proposes that markers simply move around in space in an analogical way, much as one would move dolls to show the interaction among people. Below I examine additional problems faced by both approaches.

## UNACCEPTABLE FORMS

Much of the data discussed below comes from an ongoing classifier analysis project related to the meanings and forms of fully acceptable classifier predicates. An important aspect of this project involves an attempt to identify unacceptable classifier predicates.[7] The ability to identify unacceptable classifier predicates is crucial to understanding the nature of the signs being examined. At this stage of the project, the focus is still on collecting fully acceptable signs, while, at the same time, paying close attention to potential gaps—signs we do not see, but that are predicted to be possible. The four ASL consultants assisting in this project are Deaf and grew up in families with Deaf parents. They attended residential schools in different parts of the country and all are currently students at Gallaudet University in Washington, DC.

Some unacceptable signs are described in Supalla (1990), where the existence of serial verbs is attributed to nonexistent signs. Supalla observes that signs expressing manner of locomotion such as running, limping, or pushing off with one leg while coasting on a wagon, do not simultaneously show movement along a path. Supalla (1990) attributes this to a selectional restriction that disallows combining body classifiers with "morphemes for path of motion, direction of motion, or

manner of motion along the path" (p. 144). Thus, in order to express 'limping in a circle', one must first produce a sign describing the type of locomotion, then another verb describing the path.

The systems proposed by both Supalla (1990) and DeMatteo (1977) predict large numbers of other signs that we do not see. For example, Fig. 9.8 illustrates four ways of expressing that a person walked from one place to another. In Fig. 9.8a, an upright 1-handshape moves in a straight path. In Fig. 9.8b, the same upright handshape moves along the same path but with a superimposed up and down bouncing movement.

The sign in Fig. 9.8b also differs from the sign in Fig. 9.8a in the accompanying nonmanual signal. In Supalla's (1982) analysis, the up and down movement is a secondary movement affix encoding something about the manner of the movement. It doesn't appear to encode a bouncing manner, because that would imply hopping or jumping. Instead, it appears to encode a meaning more related to an unhurried manner of movement.

In Fig.9.8c, a V-handshape with the fingers oriented downward moves along a path while the fingers wiggle. If we assume that the bouncing movement is an affix, then it ought to be possible to attach that affix to the sign in Fig. 9.8c, producing the sign in Fig. 9.8d. The resulting sign, however, is unacceptable. Similarly, adding this proposed affix onto a sign depicting the movement of a vehicle ought to produce the meaning, 'drive in an unhurried manner', but this is also unacceptable. Adding this proposed affix onto a sign depicting the movement of an animal also produces an unacceptable result. We see later that the same up and down movement only occurs in two other signs that express a casual manner of movement. An analysis maintaining that the up and down movement is an affix would have to say that the affix is limited to roughly three words in the language.

A comparison of the sign in Figs. 9.8a and 9.8b reveals additional restrictions. The sign in 9.8a is used easily and naturally with the addition of a second hand. That is, suppose that a second person is represented by another 'upright person' handshape. The straight movement of the sign in Fig. 9.8a can easily be directed toward the second handshape to mean that one person walked over to the other. Although the sign in Fig. 9.8b is typically regarded as a variant of the sign in 8a, native signers consultants show a strong preference for using the straight path motion in Figure 8a rather than the bouncing form in Fig. 9.8b to describe the movement of one person to another.[8]

There are additional restrictions on combinations of path movement and handshapes. When the 'upright person' handshape moves along a straight path, it expresses the meaning, 'walk along the path'. Similarly, BIPED-WALK-TO encodes the meaning 'walk along a path'. With 'vehicle', the meaning is, 'drive along a path'. With the 'animal' handshape, the meaning should be 'walk/move along a path', but this form does not exist. Similarly, the 'upright person' classifier moves along a straight path to just ahead of the signer's face to mean, 'person walked to me'. Signers consulted for this project do not use the form with the bouncing movement meaning, 'person walked to me in an unhurried manner'. Additionally, the form with the 'biped' handshape is not used to mean, 'person walked up to me'. This could be blamed on the awkwardness of orienting the knuckles of the downward pointing fingers toward the face. But preliminary data suggests that signers also do not use this handshape to show one person walking to another person. There are other interesting restrictions connected with these three signs. The 'upright person' handshape, when a second handshape was not present, was not used to express movement either up or down a hill. To describe a person walking down a hill, signers preferred to use the 'biped' classifier rather than the 'upright person' classifier. Also, if a spacecraft were capable of pulling a person from the earth up into the spacecraft, the upward movement of the person was represented with the 'biped classifier', but not the 'upright person' classifier.
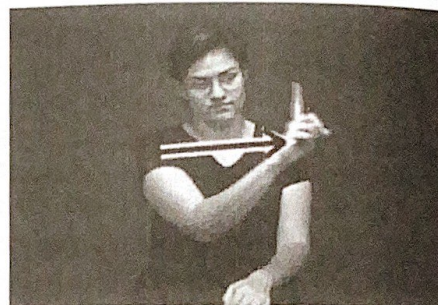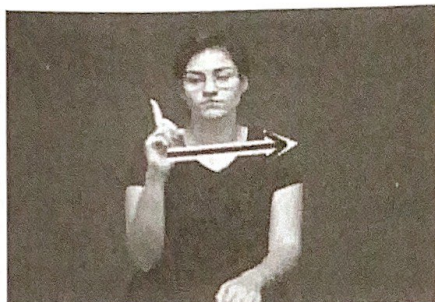
a.  UPRIGHT-PERSON-WALK-TO.
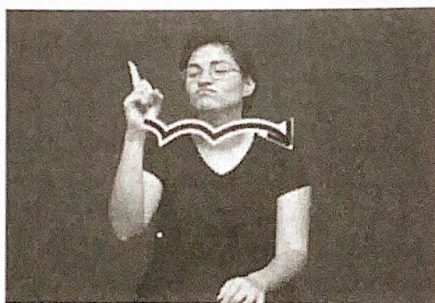


b.  UPRIGHT-PERSON-WALK-ALONG.
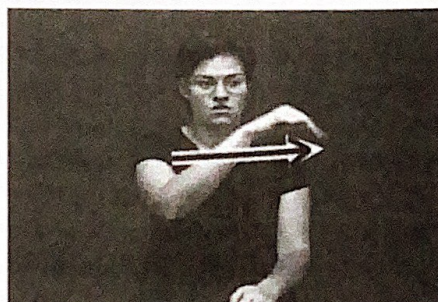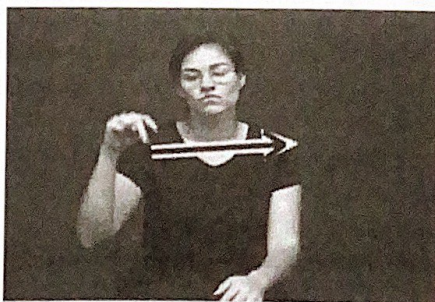


c.  BIPED-WALK-TO.



d.  BIPED-WALK-ALONG (non-existent sign).

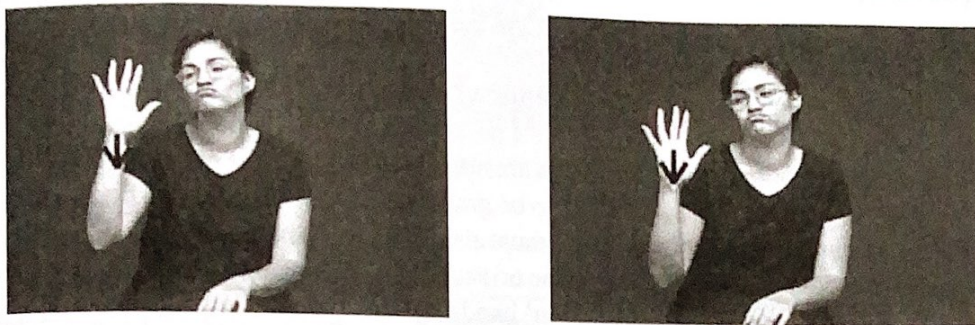FIG. 9.8.  Three actual signs and one non-existent sign.

FIG. 9.9. FIVE-PEOPLE-BE-AT.

The verb, FIVE-PEOPLE-BE-AT in Fig. 9.9 expresses the meaning that five standing people were located in a certain place. It is produced with a 5-handshape with the thumb and fingers extended and straight. It is produced with a short downward movement followed by a hold.

This verb was acceptable following the subject, FIVE PEOPLE. Thus, the 5-handshape is acceptable in that verb. In contrast, most of the informants would not use this handshape in signs expressing the movement of five people. However, there is a sign expressing the movement of several people to another person. This sign is produced with a nonmoving, vertical 1-handshape and a 5-handshape with the thumb and fingers slightly bent. The "bent 5" hand moves toward the 1-handshape in a straight line. There is no equivalent sign with a superimposed bouncing movement. There is also no equivalent one-handed sign. That is, the nonmoving 1-handshape appears to be a required part of this sign.

It is possible to use a classifier predicate to show a car crashing into a tree. In doing so, when the tip of the 3-handshape contacts the forearm, the fingers bend into a hooked configuration so that the flat surfaces of the hooked fingers are in contact with the forearm. Supalla (1982) analyzes this as resulting from the addition of a 'broken/wrecked' affix, realized as the change in handshape. Interestingly, there is no comparable form, WRECKED-VEHICLE-BE-AT, produced with a short downward movement followed by a hold. That is, although VEHICLE-BE-AT is fine, there is no comparable verb, WRECKED-VEHICLE-BE-AT.

If classifier predicates simply created an analogical scene as proposed by DeMatteo (1977), or freely combined an orientation morpheme with a path morpheme, as proposed by Supalla (1982), then it ought to be possible to describe a person walking backward by moving the 1-handshape with the back of the hand toward the goal. This potential sign is not acceptable.

The next example is taken from a narrative in which a signer describes a door that is capable of being latched by attaching a security chain from the wall to a metal slot attached to the door. The signer was describing the fact that the chain was not attached. She produced a sign in which the index finger was oriented downward and swinging back and forth. The signer, however, was describing a situation in which a chain is hanging straight down because it was not attached to the door. If this sign simply expressed the result of putting morphemes together to create a polysynthetic predicate, the side to side swinging movement should be expressing the swinging movement of the chain. The fact that this sign was used to describe a stationary chain suggests that it is a lexical form. This does not mean that the sign has no internal structure. It also does not imply that metaphor is playing no role. It simply suggests that the meaning one would expect from the swinging form does not correspond in a straightforward way to the stationary object being described.

Restrictions, gaps, and idiosyncrasies like those described above are common. Neither the "visual grammar" approach nor the "polysynthetic" approach provides an account for such restrictions.

# CLASSIFIER PREDICATES AS LEXICAL ITEMS

I have argued extensively that the spatial entities toward which indicating verbs are directed are mental space entities (Liddell, 1995, 1998).[9] I do not repeat those arguments here and proceed with the assumption that such spatial entities are not morphemic, can be placed analogically, and that the resulting spatial constructs appear to be gradient. I take it as given that the placement of the hands in producing classifier predicates must also be seen as part of this analogical and gradient structure. In addition, some aspects of the orientation of the hands must also be treated as analogical.[10] That is, while the 'upright person' handshape is oriented vertically with respect to a horizontal surface, the direction the palm faces is variable. Similarly, the 'vehicle' classifier is oriented with the ulnar side of the hand down, while the direction of the fingertips is variable. It would be very difficult to argue that such variable elements were part of the lexical representation of these verbs. I remove location and some aspects of orientation from consideration and assume that what remains encodes the meaning of the verb. In order to be produced, these verbs need location specifications and many need orientation specifications.

I now examine in detail the verb UPRIGHT-PERSON-WALK-ALONG, produced with a vertical 1-handshape and a bouncing movement as it moves along a path (Fig. 9.8b). Removing the variable, gradient elements, is the first step in coming to a description of the verb. In this verb, those elements are the initial and final locations of the hand and the orientation of the hand toward the final location. Once these are removed, what is left is less than a full sign because it has no features locating the hand or orienting the palm. It consists of a 1-handshape, a straight path movement with a repeated bouncing movement from the initial location to the final location, and features orienting the base of the hand downward. This combination of features encodes the meaning, 'person walks along in an unhurried manner'. Identifying this unit constitutes the first step in the analysis of this sign. When this meaningful unit is combined with the specific path and orientation seen in Fig. 9.8b, the result is called a *classifier predicate* or *verb of motion and location*.

Applying the same analytical approach to the sign in Fig. 9.8a, where the hand does not bounce, will produce a different set of features and a different meaning. In Fig. 9.10, I represent each of these verbs with an English gloss and attempt to describe the meaning associated with each.

Specific instances of UPRIGHT-PERSON-WALK-TO (Fig. 9.10a) seem to express purposeful movement toward a goal. Specific instances of UPRIGHT-PERSON-WALK-ALONG are not as centrally goal oriented, seeming to put more emphasis on the manner of walking than on the goal. It is interesting to observe that UPRIGHT-PERSON-WALK-TO can be directed toward the signer's face to mean, 'person walk to me'. The signers in this study did not favor using UPRIGHT-PERSON-WALK-ALONG directed toward the signer's face. This is also consistent with the proposal that UPRIGHT-PERSON-WALK-TO is more goal oriented than UPRIGHT-PERSON-WALK-ALONG.

Recall that the 'animal' handshape is not used on a straight path to express the walking movement of an animal. Similarly, the 'five upright people' handshape is not used to express the walking movement of five people, although it can be used to express that five people are located in a specific place. I am proposing that the unacceptability of the verbs ANIMAL-WALK-ALONG or ANIMAL-WALK-TO (with a single, hooked V-handshape) is that they are not currently part of the lexical inventory of ASL verbs. Such signs might very well exist in someone's idiolect or might one day be widespread. Although either is possible, available data makes it look like these hypothetical verbs are not widely shared across the community of ASL signers.

| Form | 1-handshape oriented base down moves along a straight path. |
|---|---|
| Meaning | 'person walks (normal forward orientation) to a place'. |

a. UPRIGHT-PERSON-WALK-TO

| Form | 1-handshape oriented base down moves along a straight path while the hand slowly "bobs" up and down. |
|---|---|
| Meaning | 'person walks along (in an unhurried manner and in a normal forward orientation)'. |

b. UPRIGHT-PERSON-WALK-ALONG

FIG. 9.10.  A comparison of two similar signs.

This is equivalent to noting that although the word *seniority* currently exists as a word of English, the potential English word *juniority* does not. It is a potential word, but is not currently an English lexical item.

The various 'be at' verbs are additional examples of lexical units. The verb meaning, 'a standing person is there', is typical. It is produced with a 1-handshape with the base of the hand oriented downward. The sign consists of a short downward movement of the hand followed by a hold. Neither the movement nor the hold is independently meaningful. The two movements, in combination with the 1-handshape oriented vertically expresses the existence of a standing person at a location. The specific location is depicted when the hand moves downward to an analogical, gradient location. I am proposing that there are a large number of such 'be at' verbs, showing the presence of entities at locations. For example, there is a verb showing the presence of an airplane at a location. Although signers generally use a "baby" C-handshape to show the movement of a saucer shaped UFO, most of the signers I asked are reluctant to produce a 'be at' verb with this handshape. This is explained in the proposal I make here by the observation that the particular 'be at' verb is not a widespread, established lexical unit of ASL. There are many other such examples. For example, although there is a 'be at' verb expressing the presence of an 'upright' car at a location, there is no corresponding 'be at' verb expressing an upside down vehicle (e.g., a car or bicycle) at a location. The lack of 'be at' verbs is more the rule than the exception for instrumental or 'handling' handshapes.

## ANALYZABILITY AND PRODUCTIVITY

The claim that classifier predicates are lexical items is independent of the nature of their internal structure. The nouns *bird* and *foolishness* are both English lexical items. The former has no morphological internal structure whereas the latter contains three identifiable morphemes. Both are lexical items of English. So far my arguments focused on the lexical status of classifier predicates. Here I take up the issue of possible morphological internal structure.

If classifier predicates are ASL lexical items, there must be an enormous number of them. Although all of them make productive use of space, the question I wish to address here is not about space. The question here is the degree to which such verbs are morphologically analyzable, have compositional meanings, and constitute a productive morphological system.

Although I have been using the term *classifier predicate* and focusing on verbs with meaningful handshapes, this analysis does not necessarily draw a categorical distinction between verbs with handshapes corresponding to entities and similar verbs where the ability to associate handshapes with entities is less clear. For example, the sign, DRIP-AT (Fig. 9.11a), is also placed in space in the same way and signifies an action taking place at a location. It is produced by releasing the index finger being held back by the thumb and extending the index finger downward. The wrist also contracts, giving an additional downward component to the movement of the tip of the index finger.

Instances of DRIP-AT also involve placing the hand at an analogical location. The downward orientation of the hand is fixed and the sideward facing of the hand is not significant. It is produced with the release of the index finger seen in UNDERSTAND (Fig. 9.11b). It would be difficult to make a claim that the two handshapes of DRIP-AT are classifier handshapes. The extended index finger does not represent a drop of liquid. The drop of liquid is understood to have proceeded downward in the direction of the extended index finger. As a result, this particular sign appears to be virtually unanalyzable from a morphemic perspective. This is not to say that this sequence of handshapes may not be motivated. The straightening of the index finger along with the contraction of the wrist make the fingertip move along a path. The sign, TATTLE, contains the same handshape sequence and can be viewed as metaphorically expressing the movement of information from one person to another. At issue here is whether the
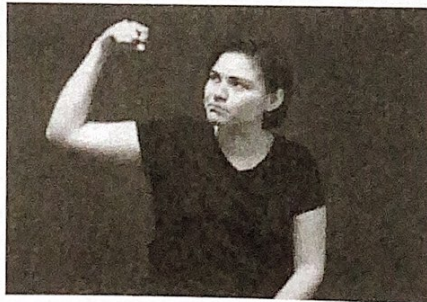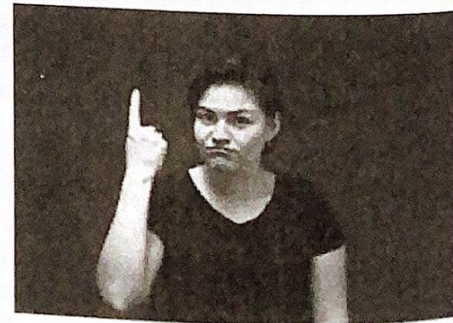
a. DRIP-AT
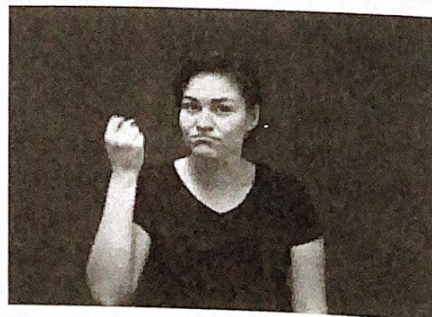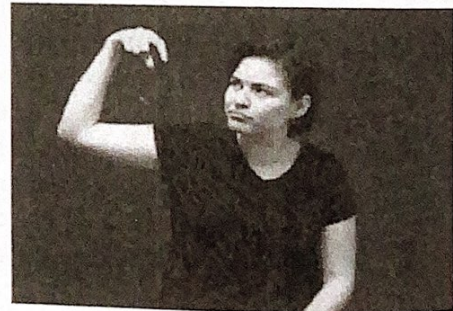
b. UNDERSTAND

FIG. 9.11. Two signs made with the same release of the index finger.

handshape sequence should be viewed as a morpheme. For example, the consonant sequence [rl] occurs in the English words like *curl, swirl, whirl, twirl, furl,* and *gnarl.* Because these words all have meanings related to round, twisted shapes, the sequence [rl] comes to suggest these meanings. Linguists do not analyze [rl] as a morpheme in these words because the remainder of each of the words has no identifiable meaning. As a result, we are left with the observation that the sequence [rl] is suggestive of twisting and turning shapes.[11] As a result, it is not the meaningfulness of the handshape sequence that is at issue, but the best way to analyze that handshape sequence. Regardless of the ultimate analysis of the two handshapes in DRIP-AT, the verb nevertheless acts like a classifier predicate in that producing it involves placing the hand at an analogical spatial location.

Most of the verbs described in this chapter are produced with meaningful handshapes. In addition, each meaningful handshape tends to occur in more than one verb. For example, I have already discussed a number of verbs produced with a 1-handshape, representing a person standing or walking. One such verb, UPRIGHT-PERSON-BE-AT, appears to be fully analyzable into two morphemes. It is produced with a vertically oriented 1-handshape that occurs in many other signs also expressing the meaning, 'person standing or walking'.[12] The downward movement followed by a hold constitutes the remainder of the lexical verb. This verb root predicates the presence of an entity at a place and the upright person morpheme identifies the type of entity predicated as existing at that place.[13] The combination of a meaningful verb root and a combination of features representing a standing human together appear to constitute the lexical verb, UPRIGHT-PERSON-BE-AT. As with all classifier predicates, any instance of this verb will require placing the hand at an analogical location, facing in an analogical direction.

Verbs like UPRIGHT-PERSON-BE-AT or VEHICLE-BE-AT appear to be fully analyzable. Is this pattern so strong that one can freely construct new verbs of this type? The answer is *no.* I already described the unacceptability of the nonexistent sign, WRECKED-VEHICLE-BE-AT, and UPSIDE-DOWN-VEHICLE-BE-AT. The nonexistence of these forms suggests that although the number of existing signs is very extensive, it is not necessarily highly productive because one cannot freely produce new forms. This does not mean that it would be impossible to coin a new form. Just as the potential English word *juniority* may someday become a real word of English, WRECKED-VEHICLE-BE-AT or FLYING-SAUCER-BE-AT may also someday become widespread in ASL. But it is clear that one cannot simply "put pieces together" and have an acceptable sign.

The verb UPRIGHT-PERSON-WALK-ALONG, appears to be less fully analyzable. Because it does have the 1-handshape oriented upward expressing the meaning 'upright person', that form-meaning unit is an identifiable part of the verb. A comparison of the forms of UPRIGHT-PERSON-WALK-ALONG and UPRIGHT-PERSON-WALK-TO shows a significant movement difference. UPRIGHT-PERSON-WALK-ALONG has a slow bouncing movement as the hand moves along its path and also is produced with the nonmanual signal 'mm', signifying relaxation and enjoyment. The two signs also differ in their focus on arriving at a goal. What meaning can be associated with the bouncing movement? Could it be responsible for both the lack of focus on a final destination as well as something about the manner of walking? If there were other signs that could be produced with this slow bounce, it might help lead to an answer to this question. Apparently, the only other signs with this movement appear to be TWO-UPRIGHT-PERSON-WALK-ALONG and THREE-UPRIGHT-PERSON-WALK-ALONG.[14] This slow bouncing movement clearly does not exist with the 'vehicle' handshape or the 'animal' handshape to express unhurried movement without focus on an eventual goal. This

limited data makes it difficult to support the bouncing movement as morphemic. The most one could say is that, if it is morphemic, it is highly restricted. It only appears in (apparently) the signs, UPRIGHT-PERSON-WALK-ALONG, TWO-UPRIGHT-PERSON-WALK-ALONG, and THREE-UPRIGHT-PERSON-WALK-ALONG.

The various patterns presented in this enormous number of classifier predicates could potentially lead to the production of new verbs. For example, I showed a signer a drawing of an automobile whose back tires had become legs. With those two legs, the car was able to walk upright. When asked how to describe the walking vehicle, the signer first explained that the tires had become legs, then produced the novel classifier form shown in Fig. 9.12. It looks like the verb BIPED-WALK-TO, but with the addition of the 'vehicle' handshape on top of the 'biped' handshape.

The two handshapes together represent this hybrid entity. This nonce form was created on the spur of the moment and is not an established lexical form in ASL. It was possible to build it, however, because a number of existing verbs expressing movement along a path exist and can serve as the basis for a schema for movement along a path. The schema involves the movement of a handshape oriented in a particular way from one place to another. The primary difference between the various forms is in the handshape that appears as part of the verb and the way the handshape is oriented. In order to create a new verb, a new handshape and orientation combination signifying a particular type of entity is needed.

The signer chose the put two handshapes together to represent the entity. The 'biped' handshape was used in its normal orientation. The 'vehicle' handshape, however, was not. Instead, the base of the hand faced down with the fingertips facing up. Note that this is a novel combination of handshapes that does not represent two distinct entities. Thus, this is not a straightforward productive addition of a handshape morpheme to an existing verb. The biped part of the combination does not represent a human and the vehicle part does not represent a complete vehicle.

The point of this example is that it is possible for new forms to come into existence based on the patterns (schemas) observable across the set of classifier predicates. If automobiles walking upright were a common sight, I would expect that this sign (or something like it) would come to be an established ASL verb.

There is additional anecdotal evidence supporting the lexical treatment of classifier predicates being proposed here. It has to do with the issue of specialized vocabulary. It is well known that a technical vocabulary develops around specialized activities. Over the past 25 years, I have frequently asked native signers to describe things. Several times over the years I have been told,
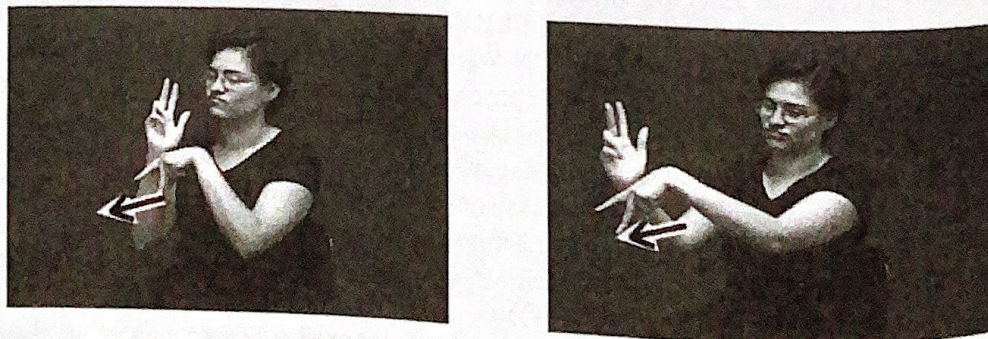


FIG. 9.12. BIPED-VEHICLE-WALK-TO.

"I can't tell you about *X* because I don't do *X*." For example, a female signer explained that she could not describe what happens on the football field because she does not play football. This response was puzzling for many years. I now see this as an issue of technical vocabulary. Football players develop the technical vocabulary needed to talk about football. Because much of football involves motion, positions, and action, it would be normal for much of that vocabulary to involve classifier predicates. As football players, they learn that vocabulary. A native signer that was not involved in football would not know that vocabulary—classifier based or otherwise.

Classifier predicates vary in terms of analyzability, compositionality, and productivity. Once placement and some aspects of orientation are removed from consideration, some of these signs are almost completely analyzable whereas others are virtually unanalyzable. I suggest that it does not make sense right now to discuss the issue of productivity for classifier predicates as a class. Issues of productivity will have to await identification of patterns within specific subclasses. Some of these may be more productive than others.

## BLENDED SPACES

The verbs I have described in this chapter share one final characteristic. The signer always places them within a spatial conceptualization "projected" into the space ahead of the signer. These projections create grounded, blended mental spaces (Liddell 1995, 1998, 2000, Liddell and Metzger 1998). Liddell (in press) examines many verbs of this type.[15] In one example, a signer describes a cat on a fence. She does this using a placed instance of the noun FENCE, followed by the clause CAT ANIMAL-BE-AT. She produces the noun FENCE along a diagonal vector in the space ahead of her. In order to properly direct her hands she has to conceptualize the space ahead of her as a topographical space containing the fence. This involves blending aspects of the scene being described with the space ahead of her.[16] In producing ANIMAL-BE- AT, she moves her weak hand to the location where the cat would be depicted on the fence and produces ANIMAL-BE-AT such that it makes contact with the radial surface of the index finger of the weak hand as shown in Fig. 9.13.

I use vertical brackets to identify elements of the blended space. Thus, the label |fence| identifies the fence conceptualized in the space ahead of the signer. The area surrounding the |fence| is the |surface| upon which the |fence| rests. The space in the scene being described is mapped onto the space near the |fence|. Space further from the fence being described is mapped onto the space further from the |fence|. During ANIMAL-BE-AT, both hands actually become part of the spatial representation depicting the cat on the fence. The signer places her weak hand such that, through blending, it becomes a part of the |fence|. The subject CAT identifies the animal de-
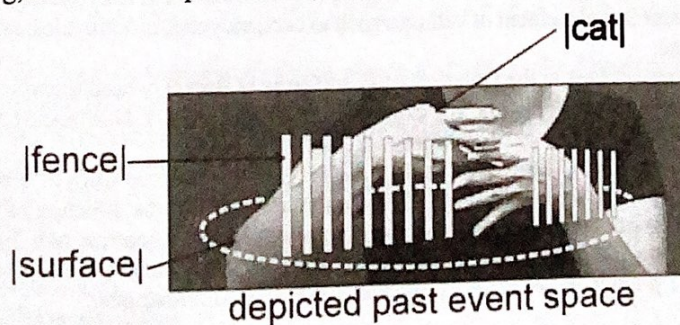


FIG. 9.13. Depicting a cat on a fence in the space ahead of the signer.

scribed by the verb as a cat. In addition, the handshape producing ANIMAL-BE-AT blends with the cat being discussed to become the |cat| in the depiction ahead of the signer.

The verb signifies that an animal is located at a place. This information is encoded as part of its lexical semantics. The physical relationship between the cat and the fence, however, is shown by the physical placement of the two hands. The location of the hand producing ANIMAL-BE-AT depicts the location of the animal in the blended space. By placing the hand on top of the hand blended with the |fence|, the signer depicts the |cat| on the |fence|.

The result is quite unusual. The three signs in the grammatical construction above express grammatically determined meanings just like words in grammatical constructions in any language. In addition, the hands producing these signs also depict certain aspects of what is being described. In Fig. 9.13, one hand depicts a cat, the other depicts a part of a fence, and the physical relationship between the two hands depicts the physical relationship between the cat and the fence.

## CONCLUSION

I am proposing that the classifier predicates analyzed in this paper are fixed lexical verbs. These verbs become full signs by placing and directing them in analogical, gradient ways. This will always include placing the hand at an analogical location, and will sometimes include directing the hand's orientation analogically. This description is meant to apply equally to a 'locative' verb such as DRIP-AT and a 'classifier predicate' such as VEHICLE-DRIVE-BY. I am suggesting that this should be the starting point for a morpholocial analysis.

These verbs vary in their analyzability. In general, meaningful handshapes can be identified. Once we get beyond handshapes, however, finding morphemic parts is not so straightforward—and goes beyond noting that a certain meaning is being expressed. Based on the data I have looked at, classifier predicates do not appear to be polysynthetic. It is probably too early to speak with any confidence about productivity within this system. Before talking about productivity it will first be necessary to identify the units that are supposed to contribute to that productivity. This identification will need to be based not only on meanings expressed, but identifiable parts of signs that express that meaning.

## ENDNOTES

[1]Much of the material in this chapter can be found in Liddell (in press, chap. 9). The arguments there focus on mental space blending and meaning construction.

[2]What constitutes the class of vehicles is a language specific issue. In ASL, this handshape is used to represent the movement and placement of vehicles such as cars, bicycles, motorcycles, and trucks, but not airplanes, rockets, etc.

[3]In the 1970s, researchers at the University of California at Berkeley used the term markers rather than classifiers. This terminology appears, for example, in Mandel (1977), DeMatteo (1977), and Friedman (1975, 1977); the terminology was not widely adopted by others.

[4]Supalla (1978) describes verbs such as this one as being constructed from a "contact root."

[5]McDonald (1982) and Schick (1990) propose alternate views of the structure of these signs. I do not consider these proposals in depth here because my major aim is to contrast two diametrically opposed views on the structure of classifier predicates. The proposals by McDonald and Schick are also based on the idea that classifier predicates are highly synthetic morpheme combinations.

⁶The form of the morpheme would vary according to the individual classifier. A vehicle classifier is "upright" if the ulnar side of the hand is oriented downward.

⁷My thanks go to Melissa Draganac and Kristin Mulrooney, who have been gathering data from four ASL consultants. I would also like to thank MJ Bienvenu for insightful discussions about classifier predicates and for providing additional examples.

⁸I am purposely avoiding the use of terms like *ungrammatical* for reasons that become apparent later.

⁹Even among supporters of an agreement analysis of verbs such as GIVE, the spatial locus assigned to a physically present referent is agreed to be in the direction of that referent. Because a referent can be located in innumerable directions with respect to the signer, there is no limit on the number of such locations.

¹⁰I argue for the analogical treatment of location and some aspects of orientation with respect to indicating verbs in Liddell (1995).

¹¹This type of sound symbolism is called *phonesthesia*.

¹²Baker and Cokely (1980) describe classifiers as handshapes. However, they often cite specific instances of classifiers as combinations of handshape and orientation features.

¹³The downward movement followed by a hold is what Supalla (1978, 1982) identified as a "contact root."

¹⁴The informants consulted for this research do not use the 4- or 5-handshapes with this bouncing movement.

¹⁵Chapters 5 through 10 in Liddell (in press) provide extensive discussion of the roles of mental spaces and mental space blending in meaning construction in ASL. Chapter 9 includes an expanded discussion of the verbs being described here.

¹⁶ The conceptual process called mental space blending is described in Fauconnier and Turner (1994, 1996), Turner and Fauconnier (1996), and Fauconnier (1997). Liddell (in press) provides an extensive treatment of mental space blending in ASL discourse.

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