**	*-ikani/-kani*	counterfactual
?	*-inihi/-noho*	climax
**	*-imakoni/-mako*	unusual, unexpected

Slot K Post-mood suffixes

from slot F

-re/-ra	negator

from slot G

-ni/-no	immediate past non-eyewitness
-bone/-bona	intentional
-ne/-na	irrealis
-mone/-mona	reported

References

Buller, E., Buller, B. and Everett, D. 1993. 'Stress placement, syllable structure and minimality in Banawá', *International Journal of American Linguistics* 59.280–93.

Campbell, B. 1986. 'Repetition in Jamamadí discourse', pp 171–85 of *Sentence initial devices*, edited by J. E. Grimes. Dallas: Summer Institute of Linguistics and University of Texas at Arlington.

Campbell, R. 1988. 'Avaliação dentro das citações na língua Jamamadí', *Série Lingüística* [Summer Institute of Linguistics, Brazil] 9(2).9–30.

Dixon, R. M. W. 1972. *The Dyirbal language of North Queensland*. Cambridge: Cambridge University Press.

1988. *A grammar of Boumaa Fijian*. Chicago: University of Chicago Press.

1995. 'Fusional development of gender marking in Jarawara possessed nouns', *International Journal of American Linguistics* 61.263–94.

1999. 'Arawá', pp 293–306 of *The Amazonian Languages*, edited by R. M. W. Dixon and A.Y. Aikhenvald. Cambridge: Cambridge University Press.

2000. 'A-constructions and O-constructions in Jarawara', *International Journal of American Linguistics* 66.22–56.

Dixon, R. M. W. and Vogel, A. R. 1996. 'Reduplication in Jarawara', *Languages of the World* 10.24–31.

Ms. *A grammar of Jarawara, from southern Amazonia.*

6 Towards a notion of 'word' in sign languages

Ulrike Zeshan

1 Words and signs: on psychological and cultural validity

The question whether all languages have words may look like a nonsense question to many people, the universal existence of words being regarded as a truism in itself. Even though it is widely acknowledged that finding a strictly satisfying definition of 'word' is as difficult as defining similarly universal terms such as 'sentence' or 'language', the existence of words in all languages is not usually questioned.

As with all putative language universals, probing the validity of the claim depends crucially on looking at languages that are as 'different' as possible. If many otherwise very 'different' languages share a certain feature, it is more likely that this feature is a true universal than if only 'similar' languages are considered. The motivation for looking at the concept of 'word' in sign languages lies exactly here: for what could be more 'different' than a sign language? As Anderson (1982: 91) puts it: 'Comparison of spoken and signed languages can be especially valuable because the parallels are so surprising at first, and seem so automatic and natural after we have worked with them. The challenge of finding these parallels produces important insights into the nature of human language in general. So we can often learn more by studying a sign language than by studying one more spoken language.' This is of course not to ignore that modality-related *differences* between signed and spoken language can be just as revealing as the parallels between the two. Sign languages are of great typological importance by virtue of their visual–gestural modality, which makes them stand out as a distinct language type in opposition to the entirety of spoken languages. Certainly, using the hands and body to produce a linguistic signal and the eyes to perceive it should have consequences that mark sign languages as different from languages that use the vocal tract for producing speech signals and the ears for perceiving them. Some possible modality-related differences at the phonological level have been discussed by Gee (1993) and Anderson (1993).[1]

[1] Sign language research uses the terms 'phonology', 'phoneme' and so on, although their literal meaning obviously does not apply. The terms are used to refer to sublexical units in signs at an equivalent level of linguistic organisation as phonemes in spoken languages.

This issue will be explored in more detail in §4 of this chapter. At this point, it is sufficient to say that the more universal a feature of language organisation is claimed to be, the more imperative it is to consider its validity with respect to sign languages. This is especially true in the light of the fact that claims about universals of human language have always been based on evidence from spoken languages alone. Sign language research is only just beginning to enter the stage of linguistic typology, and considering the word unit is certainly not the worst parameter to begin with on the way towards integrating the findings of sign language linguistics with spoken language typology.

It is quite striking that sign language linguists do not usually talk about 'words'. Instead, it is the 'sign' that takes the place of the word unit in spoken languages. The question is, of course, whether this is just a terminological convention or whether there is some reason for referring to units at an equivalent level of linguistic organisation as 'words' on the one hand but 'signs' on the other hand. As in most cases of linguistic meta-talk, this issue has, to the best of my knowledge, never been addressed explicitly. So in what way exactly does a sign language sign compare to a spoken language word? Are they completely equivalent, or are signs and words different in character, either essentially or by degree? This chapter is an initial contribution to addressing this issue.

The initial justification for saying that the word and the sign are situated at an equivalent level of linguistic organisation comes from the way sign language users evidently perceive the signs of their sign language. In fact, they talk about signs in very much the same way that spoken language users talk about words, and there can be no doubt that signs as a unit have psychological and cultural validity in deaf communities. A cluster of observations confirms this point.

First of all, it is very revealing to look at meta-linguistic vocabulary in sign languages, and there are some striking generalisations that appear across different sign languages. The central meta-linguistic term in all sign languages appears to be the sign glossed SIGN, which may refer to individual signs as well as the sign language and the signing modality in general. This sign is typically two-handed, with circular, alternating movements of the hands. A form found in a number of sign languages is the one represented in figure 1. By contrast, terms for 'word', 'sentence' and 'language' may arise via influence from the surrounding spoken language, may be used with reference to written language only, or may be lacking altogether.

A number of sign languages, including Indo-Pakistani and German Sign Language, have no word for 'language', in the sense of either French 'langue' or 'langage'. British Sign Language originally lacked signs meaning 'language' and 'culture' (Kyle et al. 1985). The present signs used to represent these meanings have come into existence via the influence of spoken English. Similarly, American Sign Language does have original signs for 'word' and 'sentence'.

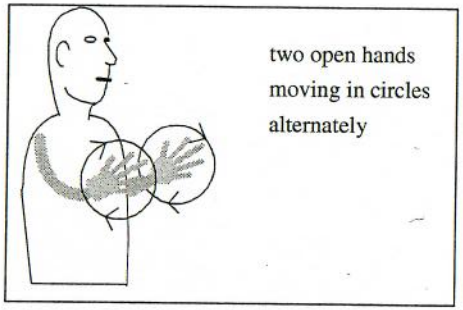

Figure 1 SIGN

Their visual representational character, 'word' being conceived of as a 'small piece' in a sentence, and 'sentence' being conceived of as a 'chain' of words, suggests that they are truly native signs. The current sign for 'language', on the other hand, is a so-called 'initialised' sign. The process of 'initialisation' is a common way for some sign languages to 'borrow' a term from a surrounding spoken language. It relies on the existence of a manual alphabet, where each letter of the alphabet can be represented by a particular shape of the hand. In American Sign Language, a word can be 'borrowed' from English by taking a semantically similar sign and changing its handshape. For the original handshape, one substitutes the handshape that corresponds to the initial letter of the target English word. So the sign LANGUAGE is made with the handshape that represents the letter 'L' in the manual alphabet, a handshape with extended index finger and thumb.[2]

In Indo-Pakistani Sign Language, the meta-linguistic vocabulary includes signs for 'word' and '(written) line/sentence/subtitle etc.', but these are predominantly used when talking about the written representation of a spoken language, for example English or Hindi, rather than with reference to the signed language. For the latter, SIGN is the usual term. Instead of a general term for 'language', two different terms are used to refer to either the 'speaking' or 'signing' modality. Terms for individual spoken languages are either the same as signs for the country and its people, such as 'German/Germany', or the same as the signs for writing the language, such as '(write) English', '(write) Urdu' (see Zeshan 2000b: 21f).

When deaf individuals talk about linguistic issues, they do so largely in terms of 'words', using the term SIGN. For example, deaf signers in India and Pakistan may state that the signs in different parts of the Indian subcontinent are similar

[2] According to a common convention in sign language research, signs are represented by English words in capital letters in this chapter. The word stands for the sign whose meaning comes closest to the meaning of the English word. When the form of a sign is important, graphic representations are used.

or different, but they do not comment on grammatical differences. Hearing and deaf people alike conceive – erroneously – of sign language as essentially lacking grammar, so that once you have learned the vocabulary of signs, you basically know the language (for more details on sociolinguistic attitudes, see Zeshan 2000b: 19ff). A similar attitude can be sensed in the efforts of deaf communities in various parts of the world to document their sign languages. Inevitably, their first objective will be to produce a sign language dictionary, listing the sign inventory and corresponding meanings in the surrounding spoken language. Efforts in this direction, made independently of each other, have led to sign language dictionaries produced by deaf associations in countries such as Uganda (UNAD 1998), Tanzania (Tanzania Association of the Deaf 1993), Pakistan (Sir Syed Deaf Association 1989) and Thailand (Wrigley et al. 1990). This is evidence for the strong relevance of the sign unit in deaf communities and is not unlike attitudes of spoken language minority groups speaking languages that have no writing system, no literary tradition and no written grammars.

2 Grammatical and phonological words in sign languages

The issue of delimiting words and differentiating between grammatical and phonological words, as pursued in this volume, has not been widely discussed in the sign language literature. Part of the reason for this is probably the fact that complex grammatical entities consisting of a sequence of elements are rather rare in sign languages. I will briefly discuss examples of two such cases, compounds and host–clitic combinations, in §3.

The lack of complex *sequential* structure does however not imply that sign languages are of a predominantly isolating type. On the contrary, signs show considerable morphological complexity. However, morphological complexity is almost exclusively *simultaneous* rather than sequential. That is, morphological modifications typically take the form of internal modifications to the form of the sign. For example, various modifications to the movement pattern of a basic sign can convey a whole range of aspectual and aktionsart distinctions. The examples in figure 2 are from Indo-Pakistani Sign Language (Zeshan 2000a: 66ff). Another well-known type of simultaneous morphology that is found across sign languages is the mechanism known as directionality. This process can be used to convey the relationship between two arguments by moving the hand from one location in space to another. The starting point usually corresponds to the subject or source of the action, the end point to the object or goal of the action. In fact, there is a continuing controversy in the sign language linguistics literature about what kind of relationship directional predicates convey, a grammatical relationship (subject–object) or a semantic relationship (agent–patient, source–goal). However, I will not go into the details of this controversy here.

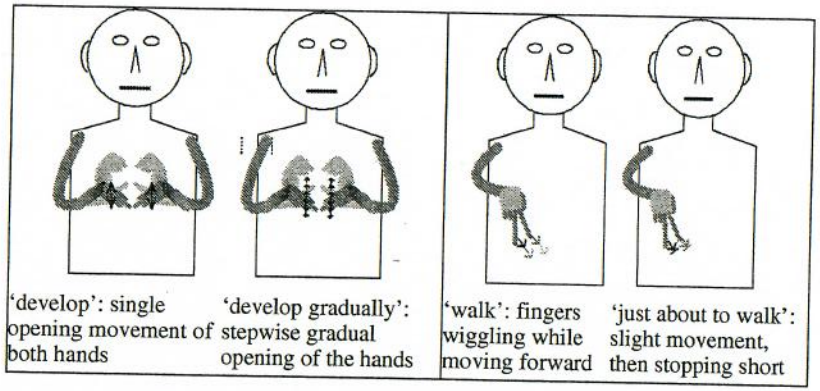

Figure 2 Aspectual/aktionsart distinctions

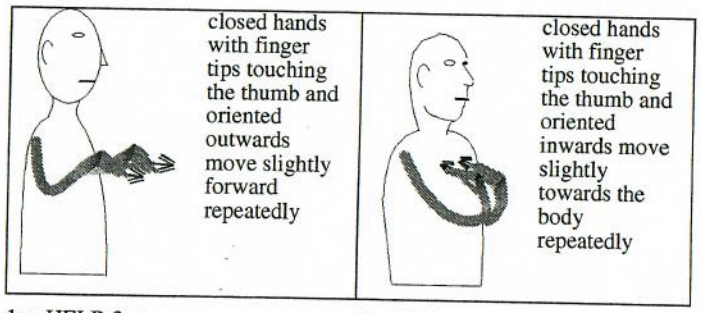

Figure 3 Directional predicates

The mechanism of directionality (see example (2)) is similar to multiple person marking on verbs in spoken languages, that is, the use of subject and object affixes on a verb stem to express grammatical relations (example (1) from Arabic):

(1) tu-saa'idu-nii
2sg:SUBJ-help:IMPERF-1sg:OBJ
You help me.

(2) 2sg-HELP-1sg (see figure 3)
You help me.

Modifications to the handshape can also convey morphological distinctions. One type of morphologically complex construction involves handshapes in a 'classificatory' function and will be discussed in more detail in the final section. In another productive process known as numeral incorporation, a handshape

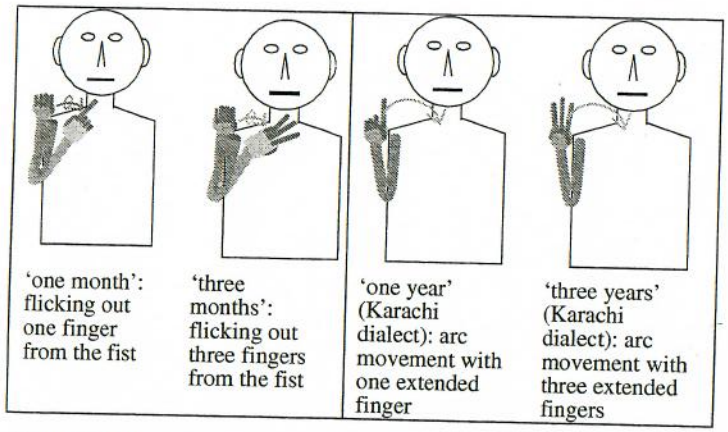

Figure 4 Numeral incorporation in Indo-Pakistani Sign Language

conveys a numerical value and is superimposed on a basic sign denoting the unit (see figure 4, from Zeshan 2000a: 74).

Moreover, many grammatical functions are marked by facial expressions that co-occur with the manually produced signs. In particular, clause types such as interrogative, negative, conditional and so on, are typically marked simultaneously on the face in various sign languages (see Baker and Padden 1978, Liddell 1980 for American Sign Language, Coerts 1992 for Sign Language of the Netherlands, Zeshan 2000b for Indo-Pakistani Sign Language). A facial expression may be the only way to mark a particular clause type, for example yes/no-questions and subordinate clauses in IPSL.

The type of simultaneous morphology discussed here is quite different in nature from what we typically find in spoken language morphology, which is predominantly realised as sequential affixing. Rather, it is comparable to the grammatical use of tone, ablaut and intonation in some spoken languages. Possible equivalents in spoken languages include mechanisms such as vowel alternations in English or German verbal paradigms of the type 'sing–sang–sung', the use of intonation alone to mark questions in many languages, or the systematic use of tone alone to mark morphological categories in tonal languages. The closest spoken language equivalent, in terms of the extent of simultaneous morphological derivations, might be the Semitic type of morphology, with an underlying root and various superimposed morphological patterns, as in Arabic:

(3) underlying root: *k-t-b*
derived forms: *kataba* 'he wrote', *kitaab* 'book', *kaatib* 'writer', *maktab* 'office', *maktaba* 'library', *aktubu* 'I write'

This type of morphological organisation has consequences for the applicability of the criteria for wordhood status as discussed in the other chapters of this volume with reference to various spoken languages. As far as phonological criteria are concerned, the question is largely one of transferring comparable phenomena to the signed modality. Of course, the term 'phonological' cannot be taken literally when applied to sign languages, since there are no sounds involved. Rather, the term has to be understood abstractly as referring to the lowest sublexical level of linguistic organisation below the morphemic level (see also §4.2.4 on sign language 'phonemes' and 'morphemes'). In this sense, concepts such as 'syllable', 'intonation unit', 'phonological word' etc. have been applied to the signed modality, chiefly with evidence from American Sign Language. It would be beyond the scope of this chapter to discuss the various approaches to sign language phonology. An overview of current theories can be found in Brentari (1996). With respect to the phonological word that concerns us here, the most elaborated recent approach is probably the one in Sandler (1999 and 2000). On the basis of evidence mainly from Israeli Sign Language, issues such as proposed characteristics of the 'canonical prosodic word' (or phonological word in our terms), the marking of phonological phrases and intonation units, and phonological rules operating within and across phonological words are discussed. According to Sandler (1999), the typical phonological word/sign adheres to the following constraints:

(a) it is monosyllabic (Monosyllabicity Constraint);
(b) it uses only one set of fingers for its handshapes (Selected Finger Constraint);
(c) is uses only one major body area (Place Constraint);
(d) it obeys constraints on two-handed combinations, such as the constraint that two moving hands must be symmetrical to each other (Symmetry Constraint).

Sandler (2000) discusses evidence for an entire phonological hierarchy in a sign language, including phonological words, phonological phrases and intonation units. The constraints on the form of a prototypical phonological word/sign all seem to work together to reduce the amount of formational complexity within a sign. When two signs come together to form a single phonological word, assimilation processes are at work to bring the resulting form closer to the form of a prototypical sign. We will see examples of this in §3 on compounds and clitics.

The evidence for the existence of phonological hierarchies in sign languages, including the level of organisation equivalent to a phonological word, seems compelling enough, although the details of their characteristics have yet to be worked out. After all, signing has a temporal as well as a spatial dimension and thus needs to have some rhythmical structure. The problem is mainly one of working out how to adequately identify and characterise each unit in the signed modality.

On the other hand, there seem to be more fundamental problems with respect to the applicability of criteria for the grammatical word as used in the other chapters of this volume. I will briefly discuss three criteria here: cohesiveness, order and conventionalised coherence and meaning.

Grammatical elements in a sign, in the prototypical case a basic form and superimposed morphological derivations, always occur together in the sign unit. However, it is not clear whether this can be taken as evidence for a particular grammatical status of these elements. This has to do with the largely simultaneous nature of the sign. The fact that elements occur together in a sign is due to purely articulatory reasons as much as to a putative grammatical status of the unit. For instance, the numeral handshape morpheme in numeral incorporation (see §2, figure 4) is necessarily coexistent with the movement pattern that stands for the unit. It would be physically impossible to produce a sign or a movement pattern that lacks any handshape. Similarly, it would be impossible for a morphological derivation such as the gradual aktionsart derivation (see §2, figure 2) to occur on its own, for example in a sequence where the basic form of a sign would occur first and the abstract movement derivation would occur separately in a sequence. Therefore, the criterion of cohesiveness is considerably weakened if taken as indicative of grammatical word status.

The criterion of order, with elements within a grammatical word always occurring in a fixed order, is even more difficult to apply to a typical sign. Again due to the sign's simultaneous nature, it is mostly impossible to argue for any order of grammatical elements within a sign, with the possible exception of directionality (cf. the sequential transcription in example (2) above; but even this interpretation can be disputed). To take the same examples as in the previous paragraph, it is impossible to argue that the numerical handshape for THREE and the sign for MONTH in a complex sign such as THREE-MONTHS (see §2, figure 4) occur in any order. They are coextensive over the whole duration of the sign. Similarly, in a complex sign such as DEVELOP-gradual (see §2, figure 2), there is no sequential order of the sign DEVELOP and the superimposed movement pattern that conveys the gradual aktionsart derivation. It would therefore seem that the criterion of order is only marginally applicable to signed languages. Its applicability is confined to particular cases of complex signs, in particular compounds (see §3.1).

The remaining criterion, conventionalised coherence and meaning of a grammatical word, fully applies to sign languages and is particularly important in the comparatively rare cases of sequential combinations of grammatical elements, as the discussion of compounds and clitics in §3 demonstrates. In-between cases of semi-lexicalisation do occur (see Zeshan forthcoming), but they do not in principle challenge the validity of the criterion. I will discuss semi-lexicalisation in more detail in §4.

In a way, the largely simultaneous nature of signs results in enhanced coherence. Indeed, another consequence of this type of morphological organisation is that despite considerable structural complexity, the question of word boundaries hardly ever arises because each sign, simple or complex, is a self-contained unit. Most signs, even when they are morphologically complex, are still 'monosyllabic', consisting of one movement or timing unit. Complex 'polysyllabic' signs, such as iterative aktionsart forms ('do something repeatedly') with repeated movement, mostly involve simple repetition of one and the same movement unit. It seems that the grammatical unit (the sign with its various superimposed morphological patterns) and the phonological unit (the unit of manual sign production) almost always coincide, and there is usually no problem in intuitively identifying words and word boundaries. However, I will argue in §4 of this chapter that the linguistic problems associated with the sign unit in sign languages lie elsewhere. They do not have to do with identifying the unit, but with the nature and characteristics of the sign in comparison to the word. But before we turn to this topic, we will first take a closer look at compounds and clitics in sign languages and discuss how the various criteria for word status, phonological and grammatical, apply to these cases.

3 Compounds and clitics in sign languages

3.1 Compounds in sign languages

One environment where it can be difficult to determine the boundaries between signs is compound formation. When two signs appear next to each other in a signed utterance, they can be more or less closely tied to each other. They may be articulated clearly separate from each other, or there may be certain formational processes of assimilation between them, especially in the case of fast or casual signing, or they may form one sign unit together and be regarded as a compound.

Sign language researchers working on various sign languages have worked out criteria for determining when two adjacent signs should be regarded as one compound sign. The following list of criteria is taken from Zeshan (2000a: 82). Some of the criteria apply to several sign languages (b, c and d) and some may be universal (most likely, a and e).

(a) There is temporal compression, with the first sign being shortened and losing stress, so that the compound has about the same duration as a simple sign (Klima and Bellugi 1979, Lucas and Valli 1995 for American Sign Language; Glück and Pfau 1997 for German Sign Language).

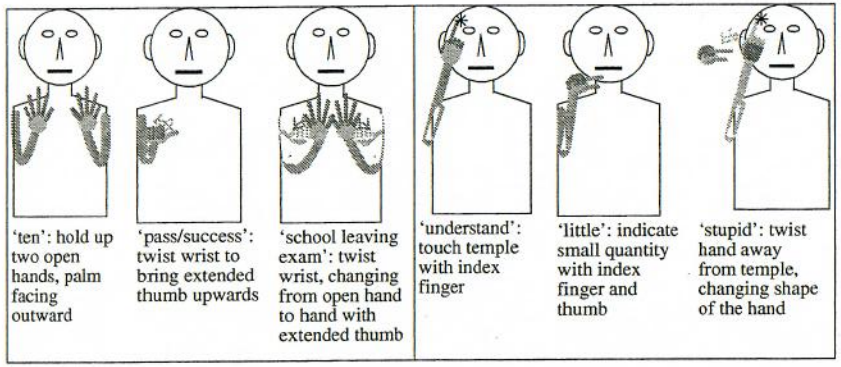

Figure 5 Compounds in Indo-Pakistani Sign Language

(b) Repetition of movement and internal movement are eliminated in the compound (Klima and Bellugi 1979, Lucas and Valli: 1995 for American Sign Language).[3]
(c) There are various assimilation processes such as recessive handshape assimilation (Collins-Ahlgren 1990 for New Zealand Sign Language) and location assimilation (Glück and Pfau 1997 for German Sign Language; Lucas and Valli 1995 for American Sign Language).
(d) A passive hand serving as the place of articulation for one part of the compound is retained in the other part as well (Klima and Bellugi 1979, Lucas and Valli 1995 for American Sign Language; Glück and Pfau 1997 for German Sign Language).
(e) The meaning of the compound may not be predictable from the meaning of the two simple signs (Lucas and Valli 1995 for American Sign Language).

Obviously, the formational criteria mentioned above do not apply to all cases of compound formation, with (a) being the likely exception. Deletion of repeated movement and internal movement only applies if there was any such movement pattern in the original signs in the first place. Similarly, spreading of a passive hand, i.e. the hand that is used as the place of articulation on or at which the other hand articulates, does not apply to signs where only one hand is used anyway. Handshape assimilation or location assimilation does not apply to compounds where handshape or place of articulation is the same in both parts of the compound to begin with. Figure 5 shows two compound signs from Indo-Pakistani Sign Language together with the individual signs to illustrate some possible combinations of formational changes – temporal compression and assimilation of handedness (one- versus two-handed) in the first example,

[3] 'Internal movement' refers to movement within a stationary hand, such as finger wiggling and wrist bending.

temporal compression and location assimilation in the second example. Also note that the meaning of the compounds goes beyond the meaning of the individual signs.

The semantic criterion (e) is particularly important because it relates to our criterion of conventionalised coherence and meaning, indicating grammatical word status. Moreover, the two parts of a sign language compound always have to occur together and in the same order. It is not possible, for example, to put the sign PASS before the sign TEN and still obtain a compound with the same meaning. Therefore, a compound is clearly one grammatical word.

Whether compounds involve one or two phonological words is less clear. The various processes of formational reduction and assimilation seem to indicate that the sign is 'trying' to behave like a single phonological word, in particular with respect to monosyllabicity. On the other hand, Liddell and Johnson (1986) present evidence for a phonological break in between the two parts of some American Sign Language compounds. The evidence is based on a particular morphological inflection, the movement pattern of the unrealised–inceptive form. This form is found with certain volitional, process verbs and conveys the meaning of 'just about to do something when . . . ' The morphological process usually operates on the whole sign, but in the case of a compound such as THINK-MARRY 'believe', it operates on the second part of the compound only. Thus the authors conclude that compounds have 'two phonological parts' (Liddell and Johnson 1986: 95). It may be noted that the authors also argue, mainly on semantic grounds, that the 'lexical compounds' under discussion are monomorphemic. However, since the argument here concerns the phonological level, I will not discuss this aspect of their contribution at this point.

While American Sign Language is a very compound-friendly language, Indo-Pakistani Sign Language has very few compounds. Moreover, Indo-Pakistani Sign Language compounds do not lend themselves easily to arguments of the kind discussed here for American Sign Language compounds, that is, arguments about the phonological status of their parts. It seems that while arguments for the status of compounds as grammatical words can be generalised across different sign languages, the question of phonological word status may be language-specific and must be determined on language-internal grounds for each sign language.

3.2 *Pronoun clitics in sign languages*

Many known sign languages use pointing signs to establish locations in the sign space for referents and to refer back to these locations in what is equivalent to pronominal reference in spoken languages. The following mini-discourse illustrates the principle:

SHOP SHOP-THERE

Figure 6 Host–clitic combination in Israeli Sign Language (from Sandler 1999: 241; 2000)

(4) a. MAN pointing-right WAIT
The man was waiting.
b. pointing-right IMPATIENT
He was impatient.

The most common pointing sign, also called index point or simply index, consists of an extended index finger pointing at a location in space (or at the signer and the addressee for first person and second person reference). The index point has many characteristics that are akin to pronouns in spoken languages, and so the index is indeed often called a pronoun in the sign language literature.

One feature that the index has in common with pronouns in spoken languages is that it tends to cliticise. Interestingly, there seems to be evidence for index cliticisation in various unrelated sign languages, although the phenomena reported are often not described in these terms. I will review some of the available evidence in this section.

Sandler (1999) describes two processes of index cliticisation, of which only the first one, 'coalescence', will be discussed here because it is more straightforward. In 'coalescence', a deictic index is encliticised to a two-handed host sign. The example in figure 6 shows the enclitic index point with the host sign SHOP. Both hands first start to articulate SHOP, then midway through the downward movement, the index clitic appears on the right hand while the left hand continues to finish the articulation of SHOP. The cliticised index loses its syllabicity, the whole host–clitic combination being monosyllabic, consisting of a single movement unit in the rhythm of the signed sentence. Thus the host–clitic combination forms a single *phonological* word. On the other hand, the index point is still a complete *grammatical* word, as indicated by the transcription of the combination as SHOP-THERE.

In addition to detailed formational analyses of the kind cited here, further evidence for index cliticisation can be found in the domain of grammatical rules as well. In Japanese Sign Language, questions are marked suprasegmentally by a particular facial expression, in the same way that questions may be marked by intonation, mostly rising intonation, in spoken languages. In polar questions,

the facial expression typically includes raised eyebrows and a slight head nod or chin tuck on the last word in the clause (example (5), adapted from Morgan 2000). Syntactically, the word order in polar questions is often rearranged, so that the question ends with an index point, or an earlier index point is repeated in final position. In this case the rule for the assignment of the head nod is slightly different: if there is a clause-final index point, the head nod co-occurs not with the index point alone, but with *both the index point and the preceding sign* (examples (6–8), adapted from Morgan 2000).

(5) --eyebrow raise
---nod
ASK-2sg OKAY
Is it okay if I ask you (a question)?

(6) INDEX-2sg BUY BOOK
You bought a book.

(7) ---------eyebrow raise
----------nod
BOOK BUY INDEX-2sg
Did you buy the book?

(8) ---eyebrow raise
----------nod
INDEX-2sg SATO INDEX-2sg
Are you Mr/s Sato?

It seems obvious that for the purpose of head nod assignment, the index point and the preceding sign count as a single phonological word. Although no details of the precise formation of the index point are provided in the source and there is thus no information about factors such as assimilation, shortening and so on, it seems reasonable to interpret the data as evidence for encliticisation of the index point to the preceding host sign.

A parallel case is the spread of mouth patterns in those sign languages where they play a significant role, such as, for example, German Sign Language. A mouth pattern is an imitation of the visible mouth movement that corresponds to a spoken language word, and it occurs simultaneously with manual signs (see Boyes Braem and Sutton-Spence 2000). Usually, each mouth pattern co-occurs with exactly one sign of corresponding meaning. However, sometimes a single mouth pattern may spread over more than one sign, similarly to the spread of the suprasegmental head nod in Japanese Sign Language. This indicates that the two signs are closely connected and can be taken as evidence for host–clitic status of a two-sign sequence. Compare these two utterances in German Sign Language (with mouth patterns in double quotes):

(9) a. "Mann da" (man there)
MAN INDEX
b. –"M a n n"– (man)
MAN-INDEX

In (9a), each sign is accompanied by one mouth pattern of equivalent meaning, the usual pattern. In (9b), however, only the head word of the host–clitic combination has a mouth pattern, which spreads over the entire host–clitic combination. So for the purpose of mouth pattern assignment, the two signs seem to count as one phonological word. Sandler (2000) draws the same conclusion with respect to the combination SHOP-THERE, which receives a single Hebrew mouth pattern *xanut* 'shop'.

American Sign Language also has index points that behave quite similarly to the encliticised forms in Israeli Sign Language. These have been described as 'determiners' in Zimmer and Patschke (1990). Formationally, these signs are shortened, lacking a movement component of their own, and they often occur simultaneously with another sign. In addition, the American Sign Language index signs are peculiar in that the direction of the pointing is insignificant and arbitrary rather than operating along the lines of localisation and subsequent anaphoric pronominal reference that I have described above: 'In most cases, the determiners used with many different characters [i.e. characters in a story] point to the same location. In fact, the data indicate that signers tend to have a preferred location that they use consistently for their determiners ... Also the determiners used with one character are not consistently directed toward one location' (Zimmer and Patschke 1990: 205). I will not address the issue of how appropriate the characterisation of these index points as 'determiners' is here. In the context of the present discussion, it should only be noted that the index points have lost phonological and grammatical weight and might be regarded as clitics by (a) losing a movement component of their own (b) co-occurring simultaneously with a host sign and (c) losing a meaningful specification for location and orientation.

In summary, the following characteristics have been found to occur with documented cases or likely candidates of cliticised index points:

(a) 'phonological' evidence: loss of syllabicity, loss of movement, loss of specification for location;
(b) syntactic evidence: clitic + host behaving as a single sign for the purpose of assignment of suprasegmentals (head movements, mouth patterns), clitic + host sign occurring simultaneously;
(c) 'functional' evidence: cliticisation occurs with elements that function as deictics, pronouns and determiners.

A host–clitic combination represents one phonological word, but two grammatical words. The 'functional' evidence is significant insofar as similar functional classes have been found to be prone to cliticisation in spoken languages,

in particular pronouns. In fact, one of the main differences between compounds and host–clitic combinations is that the former are made up of two items with lexical meaning whereas the latter consist of one lexical sign and one sign with grammatical–functional meaning. Accordingly, compounds are characterised by semantic shifts of various kinds whereas meanings remain unchanged in host–clitic combinations.

4 Words and signs revisited

The fact that it is possible to come up with formational, semantic and grammatical criteria for compounds and clitics that are comparable to criteria used in spoken languages means that there is much common ground between signed and spoken languages at the level of the word. However, although the word/sign unit can be determined in sign languages rather straightforwardly in most cases, and coherent arguments can be advanced for more complicated cases of complex words as well, this is not the whole story. Independently of *identifying* signs, it is important to consider some *properties* of signs that go beyond mere identification of sign boundaries. For example, how many morphemes does a sign typically or maximally consist of? What can be said about the internal structure of a sign? How much semantic information is transmitted in a sign, and how is this information structured? What are the effects of having two articulators (the two hands) in sign languages compared to a single articulatory tract in spoken languages? Issues such as these are addressed in this section, and we will see that signs do differ in important and very interesting ways from the words of spoken languages.

4.1 *Simultaneous words*

One difference between signing and speaking that is immediately evident even to a layman is the fact that people use two hands for signing, while speaking uses only a single articulatory tract. With signs that are one-handed, it is in principle possible to produce two words simultaneously, one with the right hand and one with the left hand. By contrast, speaking does not allow the simultaneous production of two words, so that, in the spoken language medium, there is nothing comparable to simultaneous words.

The simultaneous production of two words does indeed occur in sign languages, although this phenomenon has not been widely documented yet. However, it is clear from the available evidence that there are very specific constraints on the use of simultaneous words. It is not at all the case that one may produce a different word on each hand at any time, so that signed communication would transmit information at a double rate. In fact, as we will see presently, the term 'simultaneous words' is somewhat misleading.

Synchronisation of the two hands in simultaneous words follows one of two patterns. An example of the first pattern is the following, from Indo-Pakistani Sign Language (based on Zeshan 2000a: 124):

(10) right: PUNJAB SINDH PESHAWAR BALOCHISTAN
left: ONE----------TWO----------THREE----------FOUR
There are four (provinces): the Punjab, Sindh, the Peshawar (region) and Balochistan.

This pattern is quite common in enumerations. One hand signs the items in the list, the other hand signs the numbers. The numeral signs are held during the articulation of the next list item, as indicated by the lines after each numeral sign. Note that at no time do both hands move at the same time, so that a pattern such as in (11) is not allowed:

(11) *right: PUNJAB SINDH PESHAWAR BALOCHISTAN
left: ONE TWO THREE FOUR

Although such a pattern would actually fit the term 'simultaneous words' best, it does not occur, presumably because the processing load on both signer and addressee would be too high.

The other type of two-hand sign synchronisation also has to do with discourse organisation. After a two-handed sign, one hand remains in place while the other hand articulates further signs, as in this example (based on Zeshan 2000b: 110; the line again stands for the duration of the held sign):

(12) right: UNDERSTAND SQUARE COLOUR REMOVE, ME SELF LITTLE-BIT DESIGN
left: SQUARE----------
You know, I change the colour of the picture and add some design myself.

In this example, 'picture' is expressed by the thumb and index finger of both hands presenting a square outline. As long as the signer is talking about the picture, the left hand remains in place, while the right hand goes on signing (see figure 7, with the sign LITTLE-BIT on the right hand, and the sign SQUARE on the left hand). A similar example is reported in Bergman and Wallin (forthcoming) for Swedish Sign Language. In each case, the held left hand indicates current discourse relevance of its referent. When the signer shifts to a new topic, the left hand disappears.

This intricate interplay of the two hands is a mechanism for which nothing comparable can be found in spoken languages. It is one of the fundamental modality-based differences between signed and spoken languages and a small, yet important part of what constitutes the linguistic 'type' of signed languages. Therefore, it should not be surprising that it may be difficult to talk about the relationship between grammatical and phonological words in these signed constructions. The formulation of these concepts, based on linear sequential

'. . . add a little bit to the picture . . .':
right hand: LITTLE-BIT (pinching motion of thumb and index finger)
left hand: SQUARE (thumb and index finger extended forming a right angle)

Figure 7 Simultaneous words in Indo-Pakistani Sign Language (from Zeshan 2000b: 110)

strings of elements, has simply not provided for cases such as these ones. To say, for instance, that the sign SQUARE in example (12) is one grammatical word that consists of two phonological half-words (the two hands), and that one of these half-words can remain on its own and can by itself carry the full meaning in the absence of the other phonological half-word, does not make much sense. The parameters of description used in the other chapters of this volume are of limited use here.

4.2 *The semiotics of signs*

4.2.1 Iconicity in signs Rather early in the development of sign language linguistics, people started addressing issues related to the effects of the visual–gestural modality on language structure. Two recurrent themes appear in the literature that seem to be of fundamental importance: simultaneity and iconicity (see DeMatteo 1977, Mandel 1977, Armstrong 1983 for examples of earlier discussions of iconicity in sign). While simultaneity has been discussed in §2 and further exemplified in §4.1, this section deals with the effects of iconicity on the character of the word unit in sign languages. Of all topics discussed in this chapter, this issue is of the greatest typological significance and at the same time presents the greatest challenge to linguistic theory.

The iconicity of many signs is one of the first points noticed by people who encounter a sign language for the first time. Iconicity is a non-arbitrary relationship between a symbol and its referent. There are various types and degrees of iconicity, but these will not be discussed in detail here. A classification with respect to sign languages can be found in Mandel (1977). In this section, I will first start with some preliminary considerations about the nature of iconicity in sign and then limit the discussion to aspects of iconicity that are relevant to our notion of the sign language word.

Ever since the Saussurean postulate of 'l'arbitraire du signe', the linguistic symbol has been conceived of as an *arbitrary* association between form and

meaning. In fact, this is part of the idea of double articulation, itself thought to be a design feature of language. Double articulation involves two fundamental and distinct levels of linguistic organisation, whereby phonemes that are themselves meaningless make up the minimal meaningful units of language (morphemes), which in turn combine to create all the larger units of language (words, sentences). This organisation allows for a virtually infinite number of ever new utterances to be created on the basis of a very small inventory of phonemic units, a feature unique to human language. The evident and undeniable iconicity of many signs in sign languages represents a serious challenge to this concept. Unlike onomatopoetic and phonaesthetic words and sounds in spoken language, equivalent iconic characteristics in sign languages are not at all marginal, but represent a substantial part of the vocabulary. Boyes Braem (1986) estimated the percentage of iconic signs in Swiss-German Sign Language to be about one third of the total sign vocabulary. However, it seems that this percentage may be much higher in other sign languages. In Zeshan (2000a) I estimated that at least half of the vocabulary of Indo-Pakistani Sign Language, and maybe more than that, is iconic in some way.

In iconic signs, sublexical parts of the sign (chiefly the handshape, the movement and the place of articulation) are meaningful in that they stand for aspects of the meaning of the sign (cf. examples given in §4.2.4). This form–meaning relationship can be much more complex than the simple imitative character of onomatopoetic word such as *cuckoo*. Both concrete and abstract meanings can be represented iconically in signed languages, the latter via metaphors (which are, by the way, often similar to metaphors expressed in spoken languages; note the examples of sign families below).

It is not at all necessary that signers should be aware of the iconicity all the time or even most of the time when they use an iconic sign. The signs that will be discussed in this section are conventional units of the language and are quite different from signs and sign combinations that are created on the fly in order to express a new concept. The latter possibility also exists and can be used with great productivity, but the kind of iconicity I am discussing here is entirely compatible with conventional words. It is not necessary either that all components of a sign should be iconic. There is no strict compositionality of meaning in the kind of iconicity discussed here, so it is entirely viable for signs to have partly iconic and partly arbitrary components. Iconicity of course does not mean either that a sign can only be used when the user understands its iconic basis. Use of the sign is completely independent of its iconicity most of the time. However, there are some situations where the latent iconic potential can suddenly surface. Many sign puns and instances of word play and creative use of signs in poetry are dependent on a sign's iconicity and are evidence for people's underlying awareness of the iconic basis of a sign. Moreover, deaf people will often 'explain' the meaning of a sign in terms of its iconicity.

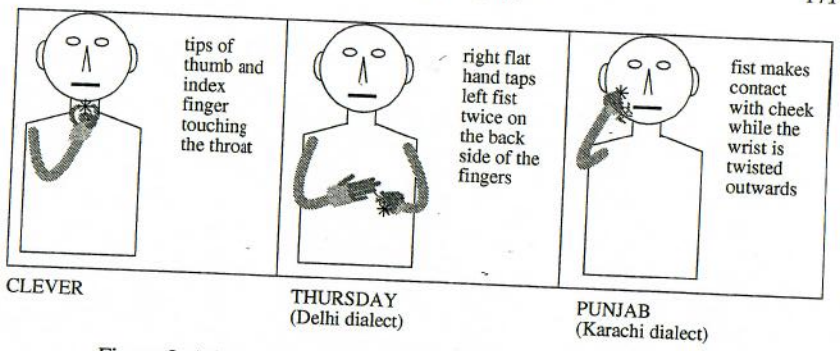

Figure 8 Arbitrary signs in Indo-Pakistani Sign Language

In the remainder of this section, I will discuss three types of form–meaning relationships in signs, of which only the third type presents a serious challenge to current linguistic theory. For each case, we will examine the semantic compositionality and the semiotic type of the signs.

4.2.2 Arbitrary signs Not all signs in sign languages are entirely or partially iconic. Each sign language also has many signs whose form–meaning relationship is entirely arbitrary. For example, the signs in figure 8 do not involve any iconicity and are entirely comparable to the usual spoken language word. This category of signs presents no problem to conventional linguistic analysis. The sublexical units, whichever way one wants to delimit and identify them, are non-morphemic, meaningless building blocks of the sign and are entirely comparable to spoken language phonemes.

4.2.3 Lexicalisation of 'classificatory' constructions Another type of sign has been discussed in detail in Zeshan (forthcoming), so it will be enough to give a brief summary here with respect to the word unit. The structure of signs can be highly complex, bordering on the polysynthetic type of morphology, and this especially happens in a number of constructions known as 'classifier' constructions.[4] In these constructions, the handshape of one or both hands represents a particular type of referent, while the location, arrangement and movement of the hand express something about the referent. Apart from the handshape, sign components such as the movement path, the relationship between two hands, the orientation of the hand in space, and movement of the fingers can all be morphemic. As is typical of the majority of sign language morphology, all morphemes are combined simultaneously.

[4] I will not discuss the appropriateness of the term 'classifier' at this point. For a detailed discussion, see Zeshan (forthcoming), where I have argued that the term 'classifier' is not really appropriate for all the constructions. However, this aspect is not immediately relevant to the discussion here.

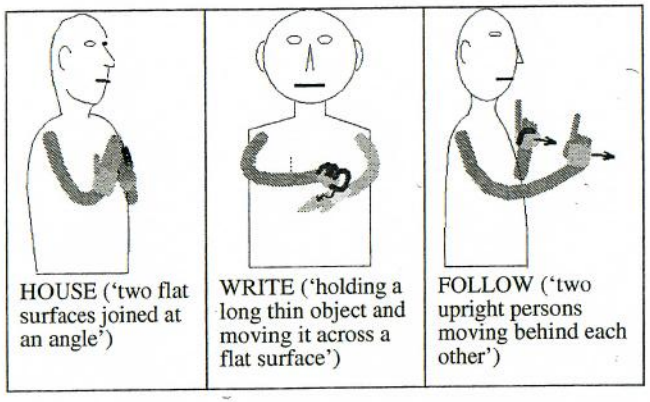

Figure 9 Lexicalised 'classifier' constructions in Indo-Pakistani Sign Language

Three types of constructions have been associated with the term 'classifier', referring to either the geometrical shape of objects, or the movement and location of a referent, or the handling of an object. All three constructions are highly productive in the sign languages studied so far, and they are a major source of lexical enrichment. Originally productive multimorphemic constructions tend to lexicalise, and the sign gradually loses its semantic compositionality. Therefore, many of these signs have a semantic structure on two levels: on the one hand, the sign is a fully conventional lexical unit whose meaning is non-compositional; yet on the other hand, the original compositional meaning is still underlyingly present and may surface in particular situations, such as linguistic elicitation or poetic use of the language. Figure 9 shows some examples, one from each construction type, with both the original compositional and the lexicalized non-compositional meaning noted (examples are from IPSL, but identical or very similar forms can also be found in a number of other sign languages).

Since the lexicalisation process is gradual, it is not surprising that there are many cases of semi-lexicalisation where a sign is in-between a productive multimorphemic construction and a fully lexicalised sign whose original compositional meaning is not synchronically accessible to signers. The classification of such signs is a major problem for lexicologists: when should a sign be included into a dictionary as a lexical entry and when should it be handled by the grammatical part of linguistic description? A detailed discussion of this problem can be found in Johnston and Schembri (1999), with reference to Australian Sign Language.

Although these constructions present a challenge to the practically oriented linguist, they do not in principle involve fundamental theoretical problems.

In fact, the phenomenon is entirely comparable to a spoken language situation where, for example, productive compounding leads to more or less complete lexicalisation of compounds. Liddell and Johnson (1986) discuss the semantics of compounds in English and American Sign Language and give examples of lexicalised compounds with non-compositional meaning from both languages (e.g. *blackboard* and *breakfast* in English, THINK-MARRY 'believe' in American Sign Language). Once one recognises the diachronic process of gradual lexicalisation, semi-lexicalised forms with partly meaningful components seem natural.

However, there does seem to be a difference between 'classifier' constructions in sign languages and comparable phenomena in spoken languages as far as the character of the sublexical units is concerned. While the parts of lexicalised compounds in spoken languages are 'ex-morphemic' and therefore not synchronically meaningful, the parts of sign language 'classifier' constructions are also 'ex-morphemic', but still partially 'meaningful' because they still carry their original iconic value. The issue is further complicated by the fact that in sign languages, semantic compositionality does not necessarily entail a morphemic status of sublexical units. That is, a sign may consist of sublexical components that are meaningful due to their iconicity, but, as the discussion in the next section will show, this does not automatically mean that they are or have ever been morphemes. As McNeill (1992) notes, even gesture is semantically compositional (the 'synthetic nature' of gesture), yet the components are not morphemes in the linguistic sense of the term. In Zeshan (forthcoming) I have argued that 'classifier' constructions describing the handling of entities are only weakly grammaticalised in Indo-Pakistani Sign Language, yet there is a large number of fully lexicalised signs based on 'handling' constructions. It therefore seems possible in sign language to have semantic compositionality directly carried over from a gestural origin, without first going through a 'morphological' stage. This is a type of lexicalisation channel not found in spoken languages. Also note that even for the more grammaticalised 'classificatory' constructions it is not entirely clear that a description of the sublexical components in terms of 'morphemes' in the usual sense is adequate. However, since it would be beyond the scope of this paper to pursue this issue further, I have gone along with the traditional 'morphemic' analysis in this section.

4.2.4 'Phonosymbolism' in signs Both arbitrary signs with non-morphemic, meaningless components and lexicalised 'classifier' signs with ex-morphemic, partially meaningful components constitute a substantial part of the vocabulary in signed languages. From a semiotic point of view, there is yet a third type of sign which is also commonly found in sign languages and also constitutes a sizeable part of the lexicon. In this type of sign, the sublexical units are not morphemes and, unlike lexicalised 'classifier' signs, have never

been morphemes in their history. Yet they are meaningful due to their iconicity. The existence of non-morphemic, yet meaningful sublexical units seriously challenges the traditional concepts of phoneme and morpheme.

The situation in sign languages resembles the case of phonosymbolism in spoken languages. Malkiel (1990) describes phonosymbolism and the theoretical questions that arise when one takes the phenomenon seriously: 'An appeal to phonosymbolism simply means that the analyst endows the sound at issue with the ability to convey, in conjunction with other elements, a certain message of its own, with being, for once, the carrier of a minor, if not necessarily minimal, semantic content. This appeal presupposes the suspension of a very widely held, almost axiomatic assumption, namely that morphemes rather than phonemes are the smallest units of speech that are equipped with this power to transmit ingredients of meaning' (Malkiel 1990: 158). In cases of phonosymbolism, individual sounds or sound combinations convey a certain 'sound-image' that goes with a particular semantic field, such as the initial sounds in English *splash* and *splatter*, or combinations such as *helter-skelter*, *flim-flam*, and the like. These sounds and patterns do not, however, behave as morphemes. Examples of phonosymbolism given in Malkiel (1990) include: the vowels *o* and *i*, cross-linguistically associated with the concepts of 'roundness' and 'smallness' respectively; onomatopoetic words such as Russian *xóxot* 'outburst of laughter', German *krächzen* 'to caw, croak', or French *cliquetis* 'clanking, clatter, jingle'; and English verbs ending in 'consonant+l', such as *wobble*, *wriggle*, *straddle*, *giggle*, *ogle*, *prattle* etc., correlating with situations that are somehow 'non-neutral' as compared to near synonyms such as *laugh* (~*giggle*), *talk* (~*prattle*), *glance* (~*ogle*) etc. Signs and their components are often of a 'phonosymbolic' character in sign languages.

To explore this issue in all detail, one would need to write a whole paper of its own. Therefore, I will just illustrate the nature of 'phonosymbolic' signs with a few examples at this point. The easiest case of an iconically motivated sign is an indexical sign, with the hand or fingers pointing at the referent. The Indo-Pakistani Sign Language sign for 'body' consists of the two index fingers, finger tips towards the body, running downwards along the torso. Although the sign components are clearly meaningful, with the location of the sign corresponding to the referent and the hands in the prototypical 'pointing' handshape, it seems to make no sense to think of them as morphemes. Note that, by contrast with the lexicalised 'classifier' signs, there is no literal reading 'two parallel lines on the torso' or 'fingers drawing lines on the torso' that would make much sense. Rather, the pointing act itself is the iconic motivation for the sign.

The form of many signs in sign languages is motivated by metaphorical links between the form and the meaning of the sign. Often there are a number of signs sharing the same metaphorical basis. Signs that share an aspect of their

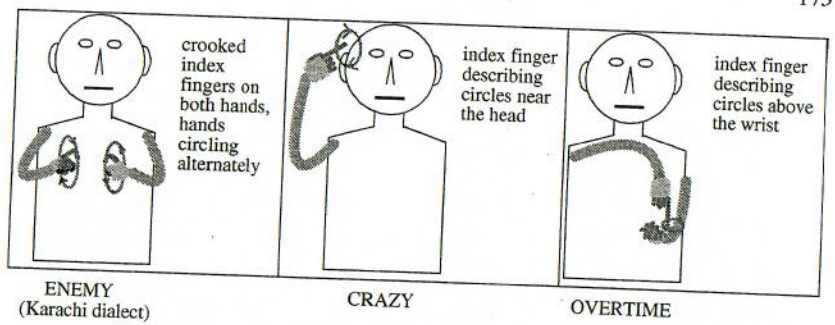

Figure 10 'Phonosymbolic' signs in Indo-Pakistani Sign Language

meaning and an aspect of their form are known as 'sign families' (Klima and Bellugi 1979: 81). In Indo-Pakistani Sign Language and other sign languages, a number of signs from the semantic field of cognition have a location at the temple, the metaphorical 'seat of cognition'. Signs that have to do with time are often made at the wrist location. Yet these locations do not function as morphemes in the way that, for instance, the beginning and ending locations of directional predicates do. Another common metaphor is the equation of upwards movement with 'positive' and downwards movement with 'negative', a metaphor occurring in a great many spoken languages as well. This is similar to cross-linguistic phonosymbolism of the type '*i* = smallness'. In individual sign languages, particular handshapes may also carry semantic content. In Indo-Pakistani Sign Language, for example, a handshape with only the index finger extended and crooked, originally based on pulling the trigger of a gun, is associated with meanings involving some sort of violent conflict, such as the signs for 'army', 'war' and 'enemy'. This is similar to the examples of language-specific phonosymbolism mentioned above. Note that the term 'sign families' indicates there is a meaningful connection between the members, yet they are not described as being morphologically derived from each other, nor is there any morphological process that would derive these signs from each other or from any underlying form.

Finally, consider the form and meaning of the signs represented in figure 10, all of which are partially motivated. ENEMY uses the crooked index finger handshape symbolising violent conflict, CRAZY uses the temple location symbolising cognition, and OVERTIME uses the wrist location symbolising time. All of these signs have circular movement patterns, yet it does not make much sense to regard this movement pattern as morphemic in the same way that, for example, movement patterns for aspect and aktionsart derivations are morphemic. Rather, the movement in ENEMY is (arguably) meaningless, the movement in CRAZY is based on another metaphor (the internal workings of the

brain), and the movement in OVERTIME has yet another motivation, symbolising duration. Note, once again, that literal readings based on a compositional organisation of putative morphemes do not make much sense. While 'holding a long thin object and moving it across a flat surface' is an acceptable literal reading of 'write', a circumlocution such as 'repeated circles next to the head', or even 'a time duration with reference to the head' are not viable morphemic analyses of the sign CRAZY.

For sign language iconicity, the analytical problems are the same as for phonosymbolism, except that in spoken languages, the relatively rare occurrence of phonosymbolism makes it easier for the linguist to ignore it. Note that it is entirely possible that there are languages that make much greater use of phonosymbolism than the 'Standard Average European' languages, but that their true character has not been recognised because the descriptive apparatus used by linguists is inadequate to deal with such phenomena. Results from sign language research could throw new light on such situations. For the sheer number of iconically motivated signs makes it impossible to discount iconicity as some obscure 'exception', as has been the (often unacknowledged and unjustified) tradition in spoken language linguistics. Moreover, the semantic content carried by 'phonosymbolic' elements in signs is not at all minor or minimal, but quite substantial.

Therefore, a reasonable conclusion from sign language data such as those presented in this section is that total arbitrariness of the linguistic symbol is not a necessary feature of human language. Rather, sign languages allow for a type of linguistic symbol that is of a different semiotic status than the usual spoken language word. The 'meaning-bearing' structure of these words is different, allowing for sublexical units that are non-morphemic, yet meaningful. Moreover, this type of word is not at all marginal in sign languages but represents a substantial part of the vocabulary. This argument is of great typological and theoretical importance, given the fact that the arbitrary nature of the linguistic symbol is so deeply entrenched in contemporary linguistics as to be seemingly self-evident. The very nature of the concepts of 'phoneme' and 'morpheme' is necessarily challenged when sign languages are considered seriously and described in their own terms.

Our discussion of data from various sign languages has shown that the concepts of phonological word and grammatical word can be meaningfully applied to sign languages, although the definition of the grammatical word is weakened due to the unusual simultaneous character of sign language morphology. While the two units are almost always coextensive in the sign languages known so far, there are instances of mismatches that parallel the mismatches found in spoken languages. Thus, one phonological word may consist of two grammatical words in host–clitic combinations and one grammatical word may consist of two phonological words in compounds, at least in some sign languages. However, it

seems that, from a language typological point of view, the relationship between grammatical and phonological word is not the most interesting aspect of the sign unit. The discussions of simultaneous words and the semiotics of signs have shown how the signs of sign languages may go beyond the horizons of what is known about spoken language words. The typological and theoretical importance of sign languages is all the more evident in cases where linguistic universals - or rather, what had been taken to be linguistic universals – suddenly appear in a new light altogether.

References

Anderson, L. B. 1982. 'Universals of aspect and parts of speech: parallels between signed and spoken languages', pp 91–114 of *Tense–Aspect: between semantics and pragmatics,* edited by P. J. Hopper. Amsterdam: John Benjamins.

Anderson, S. R. 1993. 'Linguistic expression and its relation to modality', pp 273–290 of Coulter, 1993.

Armstrong, D. F. 1983. 'Iconicity, arbitrariness, and duality of patterning in signed and spoken language: perspectives on language evolution', *Sign Language Studies* 3.51–69.

Baker, C. and Padden, C. A. 1978. 'Focusing on the nonmanual components of American Sign Language', pp 27–58 of *Understanding language through sign language research.* Perspectives in Neurolinguistics and Psycholinguistics, edited by P. Siple. New York: Academic Press.

Bergman, B. and Wallin, L. Forthcoming. 'Noun and verb classifiers in Swedish Sign Language'. In *Perspectives on classifier constructions in sign languages*, edited by K. Emmorey. Mahwah, N.J.: Lawrence Erlbaum.

Boyes Braem, P. 1986. 'Two aspects of psycholinguistic research: iconicity and temporal structure', pp 65–74 of *Signs of life: proceedings of the Second European Congress on Sign Language Research,* edited by B.Th. Tervoort, Publication of the Institute for General Linguistics Amsterdam: University of Amsterdam 50.

Boyes Braem, P. and Sutton-Spence, R. 2000. Editors of *The hand is the head of the mouth: the mouth as articulator in sign languages.* Hamburg: Signum.

Brentari, D. 1996. 'Sign language phonology: ASL', pp 615–39 of *The handbook of phonological theory*, edited by J. A. Goldsmith. Cambridge, Mass.: Blackwell.

Coerts, J. A. 1992. Nonmanual grammatical markers; an analysis of interrogatives, negations and topicalisations in Sign Language of the Netherlands. PhD dissertation, University of Amsterdam.

Collins-Ahlgren, M. 1990. 'Word formation processes in New Zealand Sign Language', pp 279–312 of *Theoretical issues in sign language research*, Vol. 1, edited by S. D. Fischer and P. Siple. Chicago: Chicago University Press.

Coulter, G. R. 1993. Editor of *Phonetics and phonology*, Vol. 3: *Current issues in ASL phonology.* San Diego: Academic Press.

DeMatteo, A. 1977. 'Visual Imagery and visual analogues in American Sign Language', pp 109–36 of Friedman, 1977.

Friedman, L. A. 1977. Editor of *On the other hand: new perspectives on American Sign Language.* New York: Academic Press.

Gee, J. P. 1993. 'Reflections on the nature of ASL and the development of ASL linguistics: comments on Corina's article', pp 97–101 of Coulter, 1993.
Glück, S. and Pfau, R. 1997. 'Einige Aspekte der Morphologie und Morphosyntax in Deutscher Gebärdensprache' *Frankfurter Linguistische Forschungen* 20.30–48.
Johnston, T. and Schembri, A. 1999. 'On defining lexeme in a signed language'. *Sign Language and Linguistics* 2 (2).115–85.
Klima, E. S. and Bellugi, U. 1979. *The signs of language.* Cambridge, Mass. Harvard University Press.
Kyle, J., Pullen, G., Allsop, L. and Wood, P. 1985. 'British Sign Language in the British deaf community', pp 315–23 of *SLR '83: Proceedings of the Third International Symposium on Sign Language Research, Rome June 22–26, 1983*, edited by W. Stokoe and V. Volterra. Silver Spring, Md.: Linstok and Rome: Istituto di psicologia CNR.
Liddell, S. K. 1980. *American Sign Language syntax.* The Hague: Mouton.
Liddell, S. K. and Johnson, R. E. 1986. 'American Sign Language compounds: implications for the structure of the lexicon', pp 87–97 of *Georgetown University Round Table on Languages and linguistics 1985 – Languages and linguistics: the interdependence of theory, data, and application*, edited by D. Tannen and J. E. Alatis. Washington, D.C.: Georgetown University Press.
Lucas, C. and Valli, C. 1995. *Linguistics of American Sign Language: an introduction.* Washington, D.C.: Gallaudet University Press.
Malkiel, Y. 1990. *Diachronic problems in phonosymbolism: edita and inedita, 1979–1988*, Vol. 1. Amsterdam: John Benjamins.
Mandel, M. 1977. 'Iconic devices in American Sign Language', pp 57–107 of Friedman, 1977.
Morgan, M. 2000. 'Negatives and interrogatives in Japanese Sign Language', Questionnaire for the typological project on negatives and interrogatives in signed and spoken languages, Ms., Melbourne, La Trobe University, Research Centre for Linguistic Typology.
McNeill, D. 1992. *Hand and mind.* Chicago, Ill.: Chicago University Press.
Sandler, W. 1999. 'Cliticization and prosodic words in a sign language', pp 223–54 of *Studies on the phonological word*, edited by A. T. Hall and U. Kleinherz. Amsterdam: John Benjamins.
2000. 'The medium and the message: prosodic interpretation of linguistic content in Israeli Sign Language', *Sign Language and Linguistics* 2 (2).187–215.
Sir Syed Deaf Association 1989. *Pakistan Sign Language*, edited by Syed Iftikhar Ahmed. Rawalpindi.
Tanzania Association of the Deaf (Chama cha Viziwi Tanzania, Chavita) 1993. *The Tanzania Sign Language dictionary (Kamusi ya Lugha ya Alama Tanzania).* Dar es Salaam.
UNAD (Uganda National Association of the Deaf) 1998. *Manual of Ugandan signs.* Kampala.
Wrigley, O. et al. 1990. Editors of *The Thai Sign Language dictionary, revised and expanded edition.* Bangkok: National Association of the Deaf in Thailand.
Zeshan, U. 2000a. *Sign language in Indopakistan: a description of a signed language.* Amsterdam: John Benjamins
2000b. *Gebärdensprachen des indischen Subkontinents.* Munich: LINCOM Europa.

Forthcoming. '"Classificatory" constructions in Indo-Pakistani Sign Language: grammaticalization and lexicalisation processes', in *Perspectives on classifier constructions in sign languages*, edited by K. Emmorey. Mahwah, N.J.: Lawrence Erlbaum.
Zimmer, J. and Patschke, C. 1990. 'A class of determiners in ASL', pp 201–10 of *Sign language research: theoretical issues*, edited by C. Lucas. Washington, D.C.: Gallaudet University Press.