

The complex structure of ‘simple’ signs in NGT

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Abstract

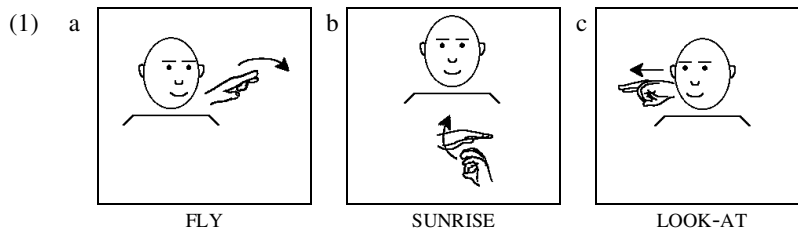
In this paper, I argue that components in a set of simple signs in Nederlandse Gebarentaal (also called Sign Language of the Netherlands; henceforth: NGT), viz. hand configuration (including orientation), movement and place of articulation, can also have morphological status. Evidence for this is provided by: firstly, the fact that handshape, orientation, movement and place of articulation show regular meaningful patterns in signs, which patterns also occur in newly formed signs and secondly, the gradual change of formerly non-inflecting predicates into inflectional predicates. The morphological complexity of signs can best be accounted for in autosegmental morphological templates.

1. Introduction

Sign language research forms a challenge for linguistic theory, since signs are expressed by manual and non-manual articulators instead of the vocal apparatus. As a result, the possibilities of simultaneity are much more extended than in spoken languages. The manual-visual modality, combined with the fact that sign languages have had a short development, also allows for quite an amount of iconicity in signs. Because of this, until recently, signs were seen as holistic units, that held no internal structure and merely mimicked actions or states in the real world.

Stokoe (1960) argued that signs of the American Sign Language (ASL) are built up out of units below the level of the sign: units that hold no meaning in themselves but together form meaningful signs. He distinguished *tab* (place of articulation of the sign), *dez* (shape of the hand), and *sig* (movement of the hand) and showed that these units are meaning distinguishing by means of minimal sign pairs. Since then, the phonological specification of signs has been extended and models have been proposed to describe the phonological features of signs and their configuration, and to account for the phonological processes within signs and over sign boundaries. Because of the partial simultaneity of phonological features within signs, many researchers have adopted autosegmental models (Liddell, 1984; Sandler, 1989; Perlmutter, 1992).

Although sign researchers agree that signs are built up out of phonemes, viz. meaning distinguishing form elements, except for inflected verbs and classifier predicates the internal morphological structure of conventionalized signs (viz. signs with a fixed form and meaning) has had little attention yet. Many signs are considered monomorphemic. This may in part be due to the fact that sign language research started out in countries in which the oral languages held many monomorphemic words and in part for practical reasons: since there was (and is) no accepted writing system for signs and the use of pictures or photographs of signs used to be difficult and is space consuming, glosses (viz. sign labels in a spoken language) were used in transcripts and examples. This may have caused researchers to confuse their analyses of the sign language with those of the spoken language that was used for the glosses. E.g. the ASL-signs FLY, SUNRISE, and LOOK-AT have been considered simple signs. However, if we take a look at the shape of these signs (1), we may be led to question these assumptions and analyse them as having been composed from morphemes, that is, distinct meaningful elements, just like complex words in polysynthetic spoken languages.

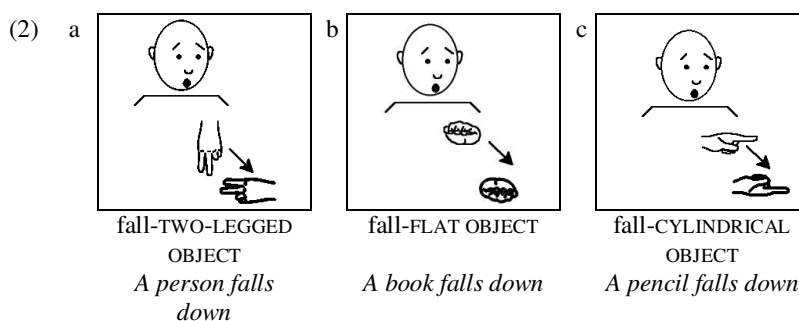


In the following, I will argue that a large set of conventionalized signs in NGT actually has a complex structure. For this, I compare the structure of a number of these signs to that of classifier predicates and inflecting verbs, of which most researchers recognize that the components 'location' and 'hand configuration' are morphemes. In the next section, I will give a brief account of inflecting verbs and classifier predicates, as a background to the arguments in the sections that follow. In sections 3 and 4, I argue for a complex morphological status for a set of so-called monomorphemic signs, drawing on similarities of the components of these signs to well-known complex signs and sign change respectively. Section 5 contains a discussion on the morphological structure of these signs, as well as a preliminary autosegmental morphological templatic model for one of these signs. The conclusions are in section 6.

2. Meaningful components in complex signs

In sign languages, certain handshapes and movements in particular environments can have a meaning of their own. Meaningful handshapes are used as classifiers in predicates of motion and location (Supalla, 1982,1986;

Zwitserslood, 1996 and references cited there). E.g. in NGT there is not one sign for 'fall', but there are variants according to the argument that is involved in the event. In (2)a, b. and c. variants are given of a falling event of a two-legged object (a person), a flat object (a book) and a thin cylindrical object (a pencil) respectively. In these signs, the movement is the same, expressing a path from a higher location to a lower location in signing space. The hand configurations, however, are different: they represent several different entities that undergo the same motion event. The set of classifier handshapes varies along different sign languages¹.



The movement of the hand(s) in predicates of motion can be varied, too: in that case, the movements indicate different motions of the referent, e.g. a straight line from one location to another location or a curved movement indicating a jump.

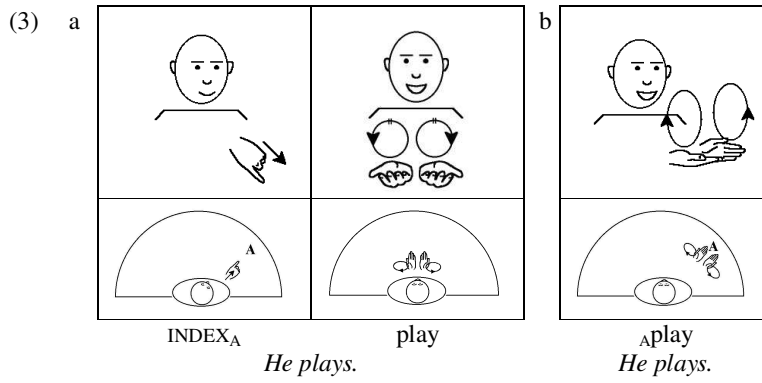
Places of articulation or locations can be meaningful as well. This is clear from the agreement paradigms in agreement predicates². These predicates use the locations in signing space to which referents have been assigned by the signer³. The examples in (3) and (4) will show briefly how this works. The sign for 'play' is an intransitive predicate that can inflect for subject⁴. Let us assume that a signer has established a referent at location A in signing space. There are two ways to sign that the referent is playing: (3)a shows the pronoun and citation form of the verb; (3)b shows the inflected verb. (The second line in the examples shows the view from above).

¹ A list of classifier handshapes in NGT is given in Appendix 2. This list is not intended to be exhaustive. Also, it is not yet clear whether some classifier handshapes are allomorphs of other classifiers. Furthermore, I do not make a distinction between types of classifiers (Zwitserslood 1996), since this distinction is of no importance in this paper.

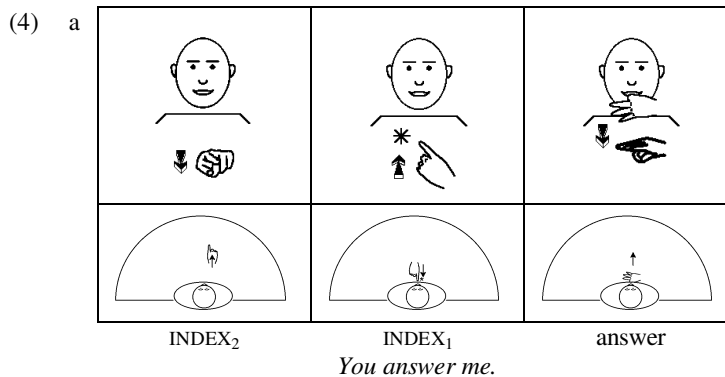
² NGT has both agreement and non-agreement predicates.

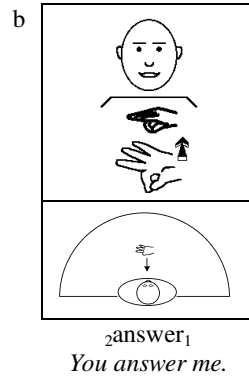
³ Agreement morphology, although preferred, is not obligatory; signers can also use a verb stem and add full DPs or pronouns to indicate the arguments. The contexts in which signers use inflected forms and uninflected forms and the reasons for this variation is still under research.

⁴ The grammatical status of the arguments in sign languages is still unclear. Word order is quite free and sign languages (at least NGT) appear to have no case markings. For ease of reference, however, I will use the terms subject and object, without making claims on their grammatical status.



In NGT, transitive verbs can agree with both subject and object (Bos, 1993). Some signs use a path movement in which the hand moves from the location of the subject to the location of the object in signing space (directional verbs) or a small repeated movement between the two locations of the referents, in which the orientation of the palm and fingers makes clear which is subject and which is object (orientational verbs). Here, we will focus on the directional verbs. An example is given in (4), with the sign for ‘answer’. Here, too, it is possible to use the citation form of the verb and use pronouns to indicate the arguments (see (4)a), or to use an inflected predicate. In the inflected predicate, the movement of the hand starts at the location of the subject and ends at the location of the object ((4)b).

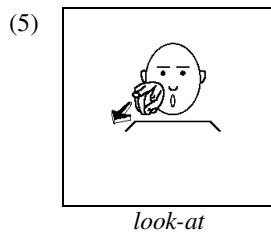




Thus, the locations of the arguments that are used in agreement predicates are meaningful in themselves, as are the handshape and the path movement in classifier predicates. With this in mind, let us have a look at a couple of 'simple' signs.


3. Complexity in 'monomorphemic' NGT signs

As mentioned before, the inventory of 'iconic' or 'motivated' signs is much larger than that of iconic words in spoken languages. I claim that certain components of a sign are not only phonological elements in that they contribute to the shape of the sign, but also can have morphemic status: they are distinct elements that have a consistent meaning in a larger set of signs. This is not only so in inflected predicates or classifier predicates, but also in conventionalized signs. In many of these signs, distinct parts, viz. hand configurations, movements and places of articulation are consistent in meaning and are used productively in the formation of new signs.⁵ I will illustrate this with the NGT sign for 'look-at' (5).

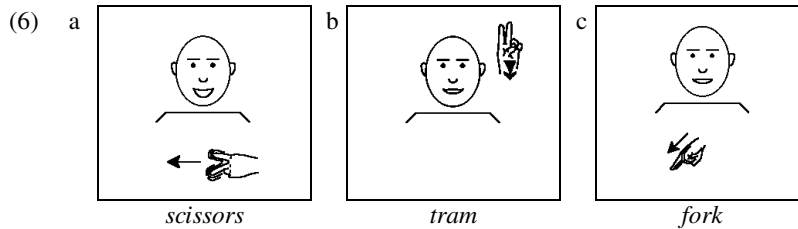


⁵ Brennan (1990) and Shepard-Kegl (1985) already pointed out that classifier handshapes are used to form new signs in BSL and ASL respectively.

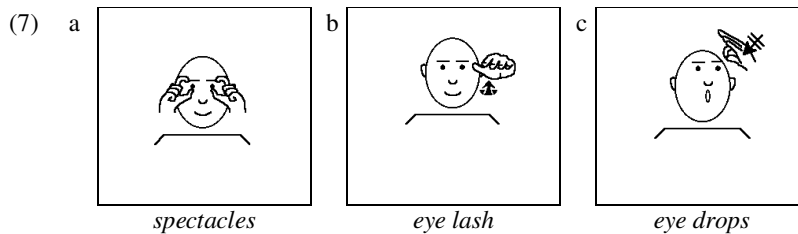
2.1 Meaningful locations, movements and handshapes

The NGT-sign for 'look-at' is made with a  handshape. The movement starts at the eyes and the hand moves outwards, away from the signer. I claim that in this sign the initial place of articulation, the handshape and the movement of the hand are morphemes, because they occur in different signs, carrying the same meaning⁶.

Firstly, we will consider the handshape. As we saw in (2)a, the handshape in the sign for 'look-at' is used as a classifier handshape in predicates of motion and location, representing entities with two thin extensions (such as legs). In the sign for 'look-at', the handshape represents two extensions moving away from the eyes: a gaze. The same handshape occurs in the signs in (6), where it represents scissor blades, the rods on top of a tram that extract power from the power cables above the tram lane and the teeth of a fork respectively. Since the handshape is morphemic in predicates of motion and location, but furthermore is used in the same consistent meaning in a set of conventionalized signs, it should be considered a morpheme in both types of signs.

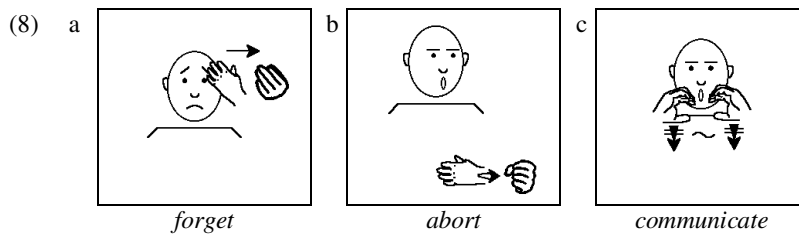


Secondly, consider the place of articulation in the sign for 'look-at': the eyes. This place of articulation occurs in several NGT signs, like those in (7). In all of the signs, this place of articulation contributes to the meaning of the sign, for spectacles are typically worn near the eyes, eye lashes are attached to the eye lids and eye drops are medicine for the eyes. Here, too, we see that a sign component has a consistent meaning. Therefore, I claim it is a morpheme.

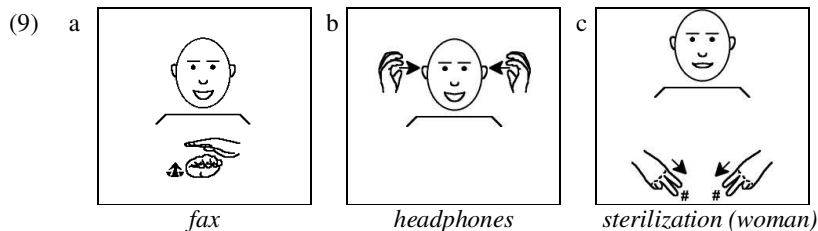


⁶ Orientation can be argued to have meaning, too, but because of space limitations I will not discuss this component here.

Finally, let us analyse the movement in the sign for 'look-at'. The hand moves along a path, starting at a (meaningful) location near the signer to a location away from the signer. This movement is also used in other signs in the meaning 'to move away from place/location x'. This is demonstrated by the examples in (8) below, in which the signs for 'forget', 'abort' and 'communicate' indicate that something is moving away from the brain, the belly and the mouth respectively. Again, a consistent meaning can be attributed to a sign component.



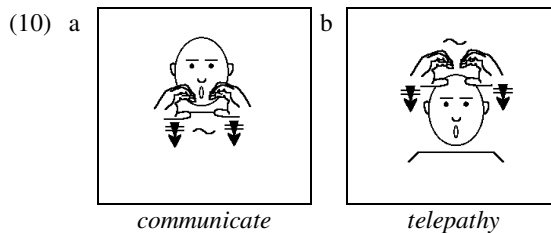
It is sometimes mentioned in the literature that signs like those in (6), (7) and (8) may have been complex once, but have lost their complexity and have become monomorphemic. However, even if signers are not always aware of the complexity of signs or even if signs have become 'frozen', the grammar provides a pattern for complex sign formation and recognition of complex signs⁷. Signers make new signs all the time and, in this, use morphemes like the ones described above productively. We can see this in relatively new signs like those in (9).



In the sign for 'fax', the dominant hand represents a sheet of paper while the non-dominant hand represents the upper part of the fax machine; the movement indicates the path movement of the paper through the machine. In the sign for 'headphones', the hands represent round entities and the place of articulation stands for the ears, while in the sign that means 'sterilization of a woman' the hands represent scissor blades and the place of articulation, low near the belly, indicates the place of the ovaries.

⁷ Likewise, speakers of English or Dutch often are not aware of the morphological complexity of words in their language, e.g. compounds. Still, their grammars can recognize the morphemes and use them in the formation of new words.

Not only does the place of articulation have a spatial meaning, it can also have a metaphorical meaning. The chest is not only associated with the chest, but also with emotions. The forehead and temple, likewise, are considered the seat of cognitive processes. An example of this is the newly formed sign for 'telepathy', which a signer invented at the spur of the moment when he wanted to express this concept (either he did not know the sign or NGT does not have a sign for this concept yet). The signer adapted the sign for 'communicate', which is normally expressed near the chin/mouth, to articulate it near the forehead. With this, he indicated a transmission from the brain, instead of from the vocal apparatus (see (10)).



Returning to the sign for 'look-at', I claim that it has a complex morphological structure of which all the morphological components should be represented.

Summarizing: some components of signs, e.g. handshape, place of articulation and path movement, each distinct elements in a sign, contribute meaning to the sign and, therefore, are argued to be morphemes.

4. From non-agreeing predicate to agreeing predicate

A connected, though somewhat different, set of data that we need to account for is the following. Over time, we observe certain changes in the place of articulation in signs, especially predicate signs. There appears to be a tendency of non-inflecting predicates to gradually become inflecting. This appears to be easiest with predicates that are phonologically underspecified for place of articulation, and thus are made in neutral signing space, for instance the sign for 'help' (see (11)a). Until recently, this sign was not inflected. Nowadays, most signers tend to inflect it for both subject and object: the verb can be inflected conform a full (singular) paradigm⁸ (see Figure 1). The inflected sign has two meaningful places of articulation, to incorporate the locations assigned to the arguments of the verb. An example of an inflected form is given in (11)b. The signer has previously assigned referents to locations A and B in signing space and says that the referent at location A helps the referent at location B.

⁸ Plural forms have not yet been investigated in NGT. In sign language agreement paradigms, the beginning and end points of the predicate signs are not fixed but reflect the locations where the referents are or are assigned a location. The paradigm sketched here uses a canonical situation of an addressee opposite to the signer and two non-present referents to the left and right of the signer.

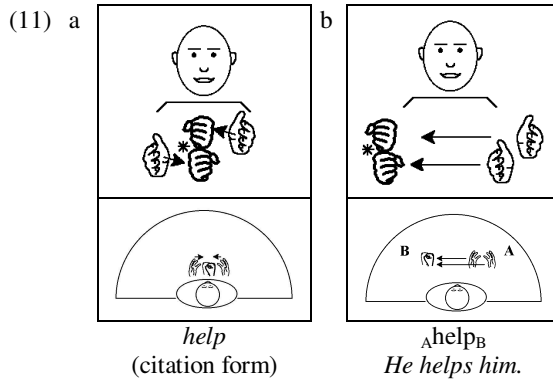
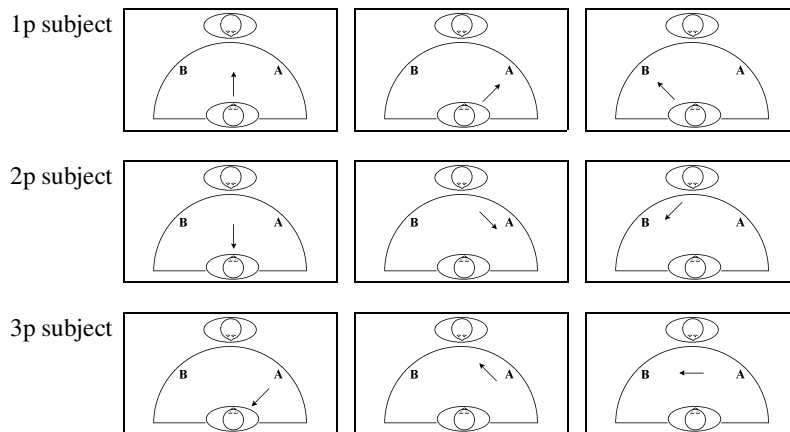


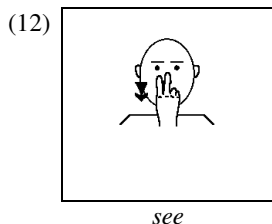
Figure 1 Inflectional paradigm for transitive verbs in NGT



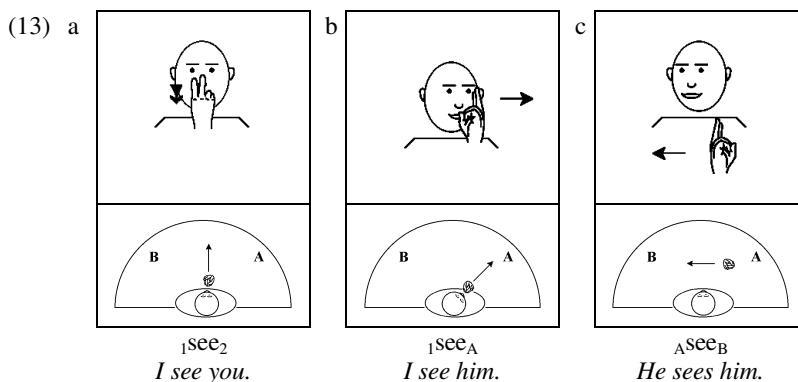
Predicates that are made near or on the body (so-called 'body-anchored signs') inflect less easy. This is usually accounted for by stating that these signs are phonologically specified for a particular place of articulation. This specification can only be substituted for other specifications in particular linguistic environments such as compounds, where the specification of one part spreads over the other part, or become underspecified in casual signing or whispering. However, it appears that place of articulation, even those that are body-anchored, can change in predicates, which change cannot be attributed to spreading in compounds (and certainly is no underspecification). I claim that the place of articulation in these signs is actually a morpheme.

Consider the NGT sign for 'see' in (12). (Notice that this is a different sign than the sign for 'look-at' in (5)!) This sign is phonologically specified for articulation near the eyes, moving slightly away from the eyes. The sign is,

thus, body anchored. A few years ago, this sign was not inflected for either subject or object.



Nowadays, though, most signers inflect this predicate for object, and for subject iff the subject is first person, which means that the end point of the sign has become meaningful and in some cases, the beginning point, too. Thus, in this stage of development of the predicate, the end point of the predicate sign has become meaningful: an extra (inflectional) morpheme slot has been filled *see* (13)a and b. A partial paradigm has become available, viz. the one that is given in the first row in Figure 1. A phonological account of this sign change can explain the fact that the beginning point is still body anchored. However, it is impossible to explain the change in the end point of the sign. Even if it is stated that the phonological features for place of articulation were underspecified, this does not explain the predictable pattern of possible place specifications in the inflected sign. A morphological account can explain this, by stating that there was an empty morpheme slot for location, which now is being filled with meaningful locations. And in those cases in which the beginning point of the predicate indicates the first person, the morpheme ‘eyes’ has blended with the morpheme ‘first person’.



The place of articulation at the beginning of the sign is tenaciously held on to; most signers still need other devices to indicate non-first person subjects. However, very recently, a few signers have been observed to inflect it for non-first person subject as well, as in (13)c. A phonological account of sign

components has no way to explain this change. A morphological account does, though: in this stage of development of the sign, the morpheme 'eye' is lost and can be substituted by any meaningful location. The whole inflectional paradigm in Figure 1 can be used with the predicate.

Thus, assuming, on the basis of what we know about inflectional predicates and what we have seen in the former section, that place of articulation can be morphemic, we can account for the changes in the inflection pattern of this and other predicates.

5. The morphological structure of complex signs

How do we account for the internal morphological structure of complex signs? Hierarchical structures like those for complex words in English, in which the linear derivation of the word and final word class are represented, is not suitable. This is because not all of the morphemes of a sign are pronounced linearly (viz. handshape and orientation can be articulated simultaneously with places of articulation and/or path movement). Also, the morphemes and their structure hold no clues as to their word class. Moreover, it is not at all clear at this moment whether one or more elements are more basic or stem-like than others in signs that do not inflect and are not classifier predicates.

A further complication is that in some signs, like the inflected predicate for 'look-at' in (5), all of the components handshape, movement and locations are meaningful, but that there are also signs in which only some, but not all of the components appear to have meaning, e.g. the signs for 'scissors' in (6)a and 'fork' in (6)c and the sign for 'fax' in (9)a, do not have a meaningful place of articulation and the handshape in the sign for 'communication' in (8)c does not have a meaning in itself⁹. Also, signs exist in which none of the components appears to contribute to the meaning of the sign; only the sign as a whole has meaning. In sign languages, a well-formed sign consists of (a) one or two handshapes; (b) one or two orientations; (c) one or two places of articulation and (d) a motion, which is either a path movement, a secondary movement like wiggling or circling (Perlmutter, 1992), a handshape change or an orientation change or a combination of these. This sets limits on the combination possibilities of morphemes in a sign, e.g. a sign cannot have three or more (meaningful) handshapes. Thus, phonology restrains the maximum of morphemes within a sign.

What seems the most suitable morphological model for a complex sign at this moment is a templatic model that holds morpheme slots for each possible morpheme in a sign. Such a model should account for both sequentiality and simultaneity of morphemes. Furthermore, it should not (yet) make claims on a) the status of the morpheme within the sign (e.g. whether the morpheme is a root or an affix) and b) the obligatoriness of the morpheme slots to be filled. A

⁹ In this sign, probably the first letter of the Dutch word 'communicatie' represented by a handshape from the manual alphabet.


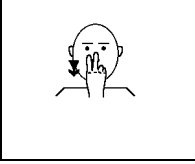
preliminary model in which all possible morpheme slots are represented is given in Figure 2.

Figure 2 Templatic morphological model for complex signs

Secondary Movement		
Orientation		Orientation
Handshape		Handshape
Place of articulation	Path Movement	Place of articulation


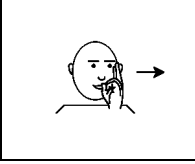
As yet, it is not possible to formulate morphological rules that govern the combination of morphemes within a sign. However, it is possible to give a preliminary representation of a complex sign within this model, e.g. for the sign for 'see'. Furthermore, it is possible to represent the stages in the development of the predicate from non-inflecting to fully inflecting. This is done in Figure 3 below. The proposed morphological template for the sign for 'see' has slots for meaningful handshape, positions and path movement. (The handshape is only specified for fingertips.) In the first stage, the sign for 'see' does not inflect at all. The first position morpheme is filled with meaningful component 'eyes'. The second position is unspecified; the exact end position is not important. (An alternative would be to state that this slot is not yet present in the template).

Figure 3 Model of the sign for 'see', stage 1

Handshape:  (tips)			
Place of Articulation: EYES	Path Movement: STRAIGHT OUT		


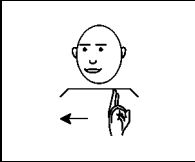
The second position slot may become available (or added) for a meaningful position, too, and, thus, filled with the location a referent in signing space (stage 2). In Figure 3 and c this is indicated with [X], with an additional index that stands for certain locations in signing space.

Figure 4 Model of the sign for '(I) see him', stage 2

Handshape:  (tips)			
Place of Articulation: EYES / 1p	Path Movement: STRAIGHT	Place of Articulation: [X] _A	

In the third stage, the meaning of the first position becomes obscured and becomes a part of the root¹⁰. Thus, the morphemic slot for first position also becomes available for another location morpheme, in which the location of another referent can be inserted.

Figure 5 Model of the sign for 'he sees him', stage 3

Handshape:  (tips)			
Place of Articulation: [X] _B	Path Movement: STRAIGHT	Place of Articulation: [X] _A	

Interestingly, the model explains why NGT does not have signs like the unwellformed sign in (14), in which both the morpheme 'eyes' and the locations for e.g. two third persons appear: there are only two slots for place of articulation. The three places of articulation in that sign¹¹ would violate the templatic structure of a complex sign, like it does in Figure 6.

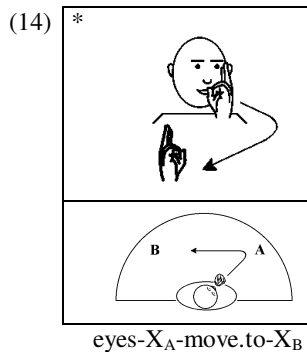



Figure 6 (Erroneous) Templatic model of the sign in (14)

Handshape:  (tips)			
Place of Articulation: EYES	Place of Articulation: [X] _A	Path Movement: STRAIGHT	Place of Articulation: [X] _B

¹⁰ This is a common phenomenon in polysynthetic languages, e.g. Navajo and Mohawk.

¹¹ The added path movement is epenthetic; it does not have meaning in this sign and, therefore, not represented in the template.

6. Conclusion

Sign language research has focussed for a great part on proving that sign languages are real, natural languages, where arbitrariness of the language played an important part, therewith disregarding the productive, but grammatical, use of iconic or rather motivated devices. The use of glosses may have had influence on the analysis of signs as well. However, as I have shown, many signs that have been considered monomorphemic should be analysed as complex. The recognition of the multimorphemic status of many signs gives strong support for the autosegmental representation of complex and simultaneous morphemes in signs that has already in part been accounted for by other sign linguists.

Further research is necessary to give more information on the status of morphemic elements in signs and to develop a more extended model of the morphological structure of complex signs. One of the most important issues is the inventory of morphemes: what counts exactly as a morpheme and what is its meaning? What rules govern the combination of the morphemes withing a sign? Another issue to be addressed is the status of orientation as a separate morpheme. Still another important issue is the relation between meaningful elements in lexicalized signs and those in variable signs, viz. classifier predicates and agreement predicates. Do they behave in the same way, or should they be assigned different status as to derivation or inflection?

Caution should be taken in this type of research, however. Preferably, new signs should be used and compared to trustworthy historical sources. Etymological assessments in dictionaries cannot be trusted too much, since they sometimes function rather as mnemonics to remember the sign than that they give the true origin of the meaning of the sign's components.

Acknowledgements

I thank the following people for useful discussion of the analysis proposed here, at the University Utrecht, the Free University of Amsterdam and the University of California, San Diego: René Kager, Wim Zonneveld, Jan Don, Maaïke Belien and David Perlmutter. I also thank the association Handicom, Harderwijk, The Netherlands, for their kind permission to use the computer program SignPS for drawing the sign pictures.

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Appendix A: explanation of the symbols in the sign pictures

- ↶ (three dimensional) arrows indicate the direction and shape of the movement of the hand(s)
- ↷ strikethroughs in arrows indicate the movement is repeated
- ☞☞** bold printed handshapes indicate the end of the sign
- * indicate contact of the hand(s) with body or the other hand
- ~ indicates that the hands move alternatingly
- # indicates that the fingers close from an opened to a closed position

Appendix B: List of classifier handshapes in NGT

