MORPHOLOGY BELOW THE LEVEL OF THE SIGN: "FROZEN" FORMS AND CLASSIFIER PREDICATES

*Inge Zwitserlood*
Radboud University Nijmegen

Abstract

The lexicons of many sign languages hold large proportions of "frozen" forms, viz. signs that are generally considered to have been formed productively (as classifier predicates), but that have diachronically undergone processes of lexicalisation. Nederlandse Gebarentaal (Sign Language of the Netherlands; henceforth: NGT) also has many of these signs (Van der Kooij 2002, Zwitserlood 2003). In contrast to the general view on "frozen" forms, a few researchers claim that these signs may be formed according to productive sign formation rules, notably Brennan (1990) for BSL, and Meir (2001, 2002) for ISL. Following these claims, I suggest an analysis of "frozen" NGT signs as morphologically complex, using the framework of Distributed Morphology. The signs in question are derived in a similar way as classifier predicates; hence their similar form (but diverging characteristics). I will indicate how and why the structure and use of classifier predicates and "frozen" forms differ. Although my analysis focuses on NGT, it may also be applicable to other sign languages.

1   On the notion of "frozen" forms

Supalla (1980) proposed a morphological continuum in ASL, ranging from "novel" signs to "frozen" signs. At the novel end of the continuum we find signs formed by new combinations of morphemes, following productive sign formation processes. The other end of the continuum contains highly frequent signs that are standardized in form and meaning in the language community. As an example of a "frozen" sign he mentions the sign for "fall", as illustrated in (1):

(1)   *ASL*
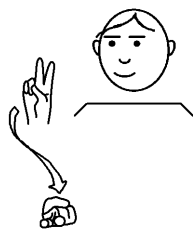
"fall"

Researchers of various sign languages (among others Newport 1982, McDonald 1983, Wilbur 1987, Schembri 2003, Sandler & Lillo-Martin 2006) follow Supalla, claiming that

many items in the lexicons of the sign languages studied have diachronically evolved from classifier constructions into monomorphemic ("frozen") signs in a process of lexicalisation. The idea that these signs are monomorphemic is based on the observation that, although similar in form to classifier predicates, these signs show semantic and morphological idiosyncrasies compared to classifier predicates. The meaning of a classifier predicate is quite predictable from its component parts and these parts have specific functions: the classifier handshapes marking agreement with the subject or direct object (Theme argument) of the clause in which the classifier predicate occurs; the location(s) of the predicate indicating the Source, Goal or Location argument(s) (Glück & Pfau 1998, Sutton-Spence & Woll 1999, Zwitserlood 2003). On the other hand, "frozen" forms show less predictable behaviour (Supalla 1980, Sandler & Lillo-Martin 2006). In contrast to classifier predicates, the handshape in a "frozen" form does not show agreement with the subject (or object) of the sentence, which becomes clear in cases where the subject (or object) would require a different classifier handshape. Furthermore, even though the trajectory along which an entity is moving in the real world may vary, the movement in a "frozen" form that expresses the event is fixed, whereas the movement in a classifier predicate may vary to show the particular trajectory. Moreover, "frozen" forms have different grammatical categories; not only "frozen" verbs occur, but also "frozen" nouns (Zwitserlood 2003, Sandler & Lillo-Martin 2006).

2 "Frozen" forms in a general lexicalisation perspective

In contrast to the rather ad hoc explanation for the idiosyncratic behaviour of "frozen" forms above, I suggest that such signs may be morphologically complex. Such signs are created following productive sign formation processes, that differ slightly from the productive formation of classifier predicates. This explains several observations about "frozen" signs that cannot be explained by an analysis of these signs as fully lexicalised (monomorphemic) signs.

General theories of lexicalisation (Bauer 1983, 1988, Brinton & Traugot 2005) acknowledge (at least) three stages in the process of lexicalisation: nonce formation, institutionalisation, and lexicalisation. Nonce formation is the stage where a language user creates a new complex word on the spot, because s/he has an immediate need for it (because there is no appropriate lexical item in the language, because s/he has forgotten the appropriate lexical item, or because of special effects). The nonce formation may have a range of meanings, but since it is used in a particular context, the intended meaning will be clear to the discourse participants. When used out of context, this particular meaning is not available and the form is ambiguous. Not surprisingly, nonce formations are also created in sign languages (Brennan 1990, Johnston & Schembri 1999, Zwitserlood 2003, Sandler & Lillo-Martin 2006 for BSL, AUSLAN, NGT, and ISL, respectively). These may be classifier constructions, but they may also be "frozen" forms. The "frozen" forms may show grammatical "idiosyncratic behaviour" as indicated in Section 1, and potential ambiguity when used out of context (Johnston & Schembri 1999).[1] The fact that "frozen"

---

1 Nonce formations may also take different forms (e.g. serial compounds), but I will not discuss these here.

forms show up in this stage argues for an analysis of these forms as morphologically complex.

Nonce formations may be one-off forms, but they may also gain currency in the language community. If so, they enter the stage of institutionalisation. In this stage, the possible ambiguity is ignored by the language users: the meaning is narrowed down to particular concepts. Interestingly, although language users may not always be aware of its morphological complexity, the lexical item still remains fully transparent in this stage. The loss of potential ambiguity of previously nonce signs has been described for ASL by Supalla (1980) and Johnston & Schembri (1999) for AUSLAN. Johnston & Schembri indicate that users of AUSLAN do not experience completely conventionalised forms as arbitrary, but can recognize the general componential meaning of such forms. This is confirmed for ASL by Brentari & Goldsmith (1993) and for BSL by Brennan (1990), who point out that parts of "frozen" forms in these languages can be reanalysed and used again in a productively formed construction within a discourse. Psycholinguistic evidence for the morphological complexity of such signs in DGS is provided by Grote & Linz (2003).

Finally, a lexical item can take on a form it could not have had if it were formed by the current productive rules and/or elements of the language. At that stage it has become lexicalised. A lexicalised form can be phonologically eroded or changed, morphological complexity may be lost, its meaning may have drifted; many forms show a combination of these. An example of complete lexicalisation is the English word *husband*, which has diachronically evolved from the Old English compound *hūs bonda* (house master). This form shows phonological erosion and cannot be reconstructed as a compound in modern day English. Furthermore, the meaning has drifted from "house master" to "married man". A lexicalised form is not necessarily opaque, e.g. the English word *warmth* may be still analysable, but because one of its original composing parts (*th*) has become unproductive, the word could not have been formed by the synchronic productive rules of contemporary English.

Lexicalisation is the stage that many sign linguists assume "frozen" forms have entered. Apart from the problem of the (sometimes extremely) short time span involved in the assumed lexicalisation of classifier predicates,[2] there is the matter of productivity. The general claim of these sign linguists is that the process of classifier predicate formation is very productive. Consequently, the existence of "frozen" forms is unexpected in a general linguistic lexicalisation perspective, since "frozen" forms can be coined on the spot by and are often morphologically transparent to the language users. Furthermore, the existence of particular "frozen" forms implies that the original forms from which they have diachronically evolved do no longer exist in the language (e.g. the word *hūs bonda* does not exist in present day English). Interestingly, I have observed that in NGT particular signs *can* co-exist as a "frozen" form and as a classifier predicate. An example of this co-existence from NGT is in (2).

---

2   Sandler & Lillo-Martin (2006:97-98) even claim that lexicalisation of a productive form into a "frozen" form can take place within a single discourse, the "frozen" form showing drastic phonological and prosodic reduction in comparison to the productive form. However, another, more plausible analysis is that the "productive" form in their example is a syntactic paraphrase, and that the following "frozen" form is a nonce formation.

(2)

a.   *NGT*

STATION   CHANGE

THERE   NEW   ESCALATOR   BE

"The station has changed; there are new escalators."

b.

SOMETIMES   STATION   SEE   PERSON

RUN   LEGGED.ENTITY-   RUN   LEGGED.ENTITY-
              MOVE-UP   MOVE-DOWN

"Sometimes at the station, you can see a person run, then ascend (by escalator)
at ease, run again, and descend (by escalator) at ease again."

The signs glossed as ESCALATOR in (2a) and LEGGED.ENTITY-MOVE-UP in (2b) are similar
in form and are both in use in NGT. The sign for "escalator" in (2a) functions as a noun[3],
whereas its pendant in (2b) has all the properties of a classifier predicate, such as agree-

---

3   The sign can also be used as a verb, depending on the context.

ment with the subject (a person being a legged entity), possibility to change the trajectory, as can be seen further on in the same example (partly depending on the location of the Source and Goal arguments, partly on the particular trajectory), and constrictions on aspectual morphology.

A final observation from NGT is that a subset of "frozen" forms have meaningful handshapes that are not part of the productive classifier system, and, to my best knowledge, have never been part of that system (see Zwitserlood 2003 for details).[4]

Summarising, the co-existence of classifier predicates and "frozen" forms, the observation that some "frozen" forms appear not to be derived from classifier predicates, combined with the observations with respect to properties of "frozen" forms described above, suggest that "frozen" forms are actually productively formed, at least in NGT (and presumably in other sign languages as well). This means that NGT (and other sign languages), besides productive processes of classifier predicate formation, also has a process of "frozen" form formation. The term "frozen" form is, then, inappropriate, and I will henceforth use the term "semantically motivated sign" (following Van der Kooij 2002). The components in the signs in question are meaningful and the signs are, thus, compositional, although the meaning of the whole cannot be fully predicted from the meanings of the parts (referents and activities are sometimes represented *pars-pro-toto*). In contrast to most compositional forms we are familiar with (especially in Dutch or English), the NGT signs in question appear to be exocentric and do not have a morphological head (Zwitserlood 2003).

A few researchers have tried to account for the morphological structure of semantically motivated signs; at least overviews of the morphemes that are used in such signs are given, notably handshapes and locations on and near the body and non-dominant hand (e.g. Brennan 1990 for BSL, Johnston & Schembri 1999 for AUSLAN, Fernald & Napoli 2000 for ASL). A serious proposal for a subset of semantically motivated signs in ISL, particularly verbs, is given by Meir (2001; 2002). Meir claims that ISL has a productive process of noun incorporation: argument noun roots (usually Instruments) can be incorporated into verbs, resulting in endocentric verbal compounds. Although Meir's analysis has some problems (for a discussion see Zwitserlood 2003: 310-315), our analyses follow the same lines in that the signs in question are analysed as compounds that are constructed from combinations of roots.

The basic consideration in my analysis is that we find morphemes below the level of the sign: sign components and combinations of sign components themselves can be morphemic (as in classifier predicates and location agreement verbs). The handshapes and locations in classifier predicates and the locations in agreement verbs have a grammatical function, viz. agreement marking. This does not exclude their possibility of having a lexical function as well; morphemes with multiple functions are found in many languages.

---

4   In NGT and in all other sign languages that have a classifier predicate system, (at least) Entity classifiers and Handling classifiers occur. The handshapes occurring in some of the "frozen" forms in NGT seem to be a combination of these two types of classifiers, in that an entity is represented and manipulated at the same time by one handshape. Typical examples of these "combined Entity/Handling classifiers" are the handshapes ✎ (illustrated in (10), where the handshape represents a knife *and* the manipulation of a knife), ✐ (representing an instrument with an extension *and* holding that instrument), and Y (representing an entity that is held in the middle, where extensions appear on both sides of the hand that is holding it.)

My claim is that signs can be derived that have exactly the same morphemes, but in which the morphemes have a different function. This is caused by different underlying structures and results in signs pairs that look similar but have different grammatical characteristics.

3   The DM framework

My analysis is based on the framework of Distributed Morphology or DM (Halle & Marantz 1993, Harley & Noyer 2003, Marantz 2001 and references cited there). The advantage of the DM framework (especially the more recent versions) is that it can quite elegantly handle some of the problems that arise in other generative frameworks, such as multifunctional morphemes, items with multiple syntactic categories, and problems in distinguishing between derivational and inflectional morphology. Besides DM, an important point in my theory is that the phonetic interfaces for spoken and sign languages differ. The surface form of a word or sign is conditioned by the articulatory possibilities of the channel. For a sign to be able to be pronounced, there are minimal and maximal requirements on the number of its components. A sign needs to be performed with at least one hand, with one orientation, and in one place of articulation. Maximally, a sign is made with two hands, both with a particular orientation, two locations, two combined activities (combinations of change in place of articulation, handshape or orientation) and a non-manual component. Signs with three different handshapes or a combination of three activities appear to be barred by the interface. (Besides the restrictions imposed by this interface, each sign language applies particular phonological rules to produce grammatically correct signs.)

I will briefly explain the most important characteristics of the DM framework that are important for my analysis of semantically motivated signs and classifier predicates. Most important of all, in DM there is no lexicon in the traditional sense, viz. a list of items with phonological and grammatical features and a meaning. Instead, DM employs different Lists, that are distributed through and outside of the grammar, as illustrated in Figure 1.
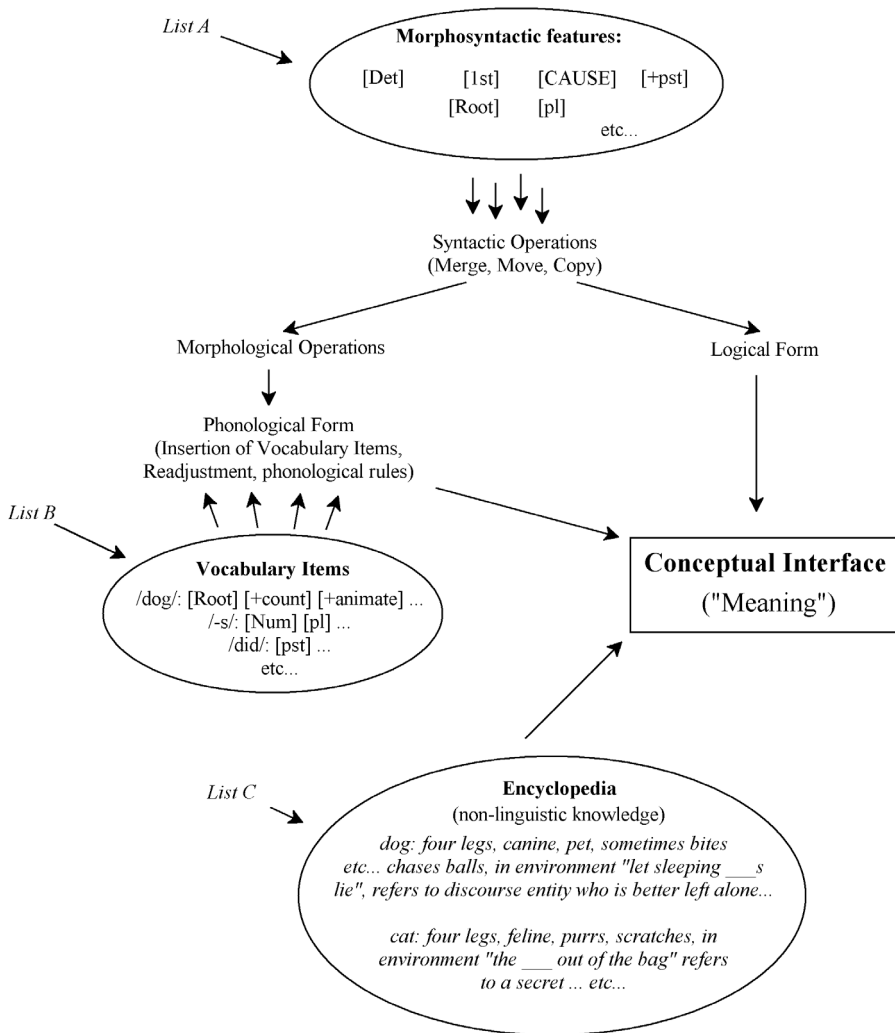
Figure 1: The structure of grammar in Distributed Morphology (Harley & Noyer 2003:465[5])

List A contains bundles of morphosyntactic features (such as [+1st], [+plural], [+animate]). These morphosyntactic feature bundles are merged at Deep Structure (DS) and during syntactic operations (e.g. Merge, Move, Copy). *List B* contains Vocabulary items: phonological features that are connected to morphosyntactic features (e.g. /s/ ↔ [+3rd] that marks the English third person inflection (in the present tense)). These Vocabulary items are inserted into the terminal nodes of the derivation at Spell-Out. *List C* is

_____

5   Illustration reproduced by permission of the publisher, Mouton de Gruyter, Berlin.

257

actually outside of the grammar and contains non-linguistic knowledge (such as the fact that a dog is a hairy four-legged canine domestic animal), which assists in the meaning negotiation of a derivation after it has reached the level of Logical Form (LF).

Important principles in DM are *Late Insertion, Underspecification*, and *Competition for Insertion*. As stated above, the morphosyntactic features in List A do not have phonological features. Phonological features (or: Vocabulary Items) are only inserted into the terminal nodes of a derivation *after* syntax and morphology, thus, at the level of Phonological Form (PF), during Spell-Out. This is the principle of *Late Insertion*.

Underspecification indicates that the Vocabulary items that can be inserted into terminal nodes are not connected to fully specified morphosyntactic features, but they only have the minimally necessary set of features. E.g. instead of having a set of phonological strings /d/ for each combination of features for person and [+past], in English there is a Vocabulary item /d/ that is connected to only the feature [+past]: /d/ ↔ [past].

Because of the principle of *Competition for Insertion*, the most highly specified Vocabulary item that shares most of the morphosyntactic features of the terminal node is inserted into that node. Thus, a morphosyntactic feature bundle [+sg, +pres] could in principle be inserted with a Vocabulary item with the feature [+sg]. However, if there is another Vocabulary item with the features [+sg, +pres], this is a better match and it will win the Competition for Insertion over the Vocabulary item with the feature [+sg]. Insertion, however, may not cause feature clashes. A Vocabulary item with the features [+sg, +past], although more highly specified than the Vocabulary item with the feature [+sg], cannot be inserted into the terminal node with the features [+sg, +pres], because of non-matching features.

Items in List A typically do not have a syntactic category (Marantz 2001). A derivation is assigned a syntactic category by merger with a category node (a head), called *little x*. The category node can be little v, little n, or little a, assigning the syntactic category of verb, noun or adjective, respectively, to the derivation built so far.

Derivations are built up cyclically. This means that a derivation can be shipped off to Logical Form (LF) and Phonological Form (PF) several times, viz. each time a cyclic domain is formed. Among others, merger of a category node forms a cyclic domain. An example of a derivation, starting with a root, merger of a head and consequent forming of a root phrase (√P), and forming of a cyclic domain by merger of a category node is illustrated in (3). As soon as the category node is merged, the derivation is shipped off to PF, where Vocabulary Insertion takes place, and to LF and the Conceptual Interface, where the meaning of the derivation is negotiated with support from List C, the Encyclopedia.
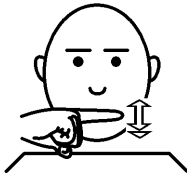
(3)
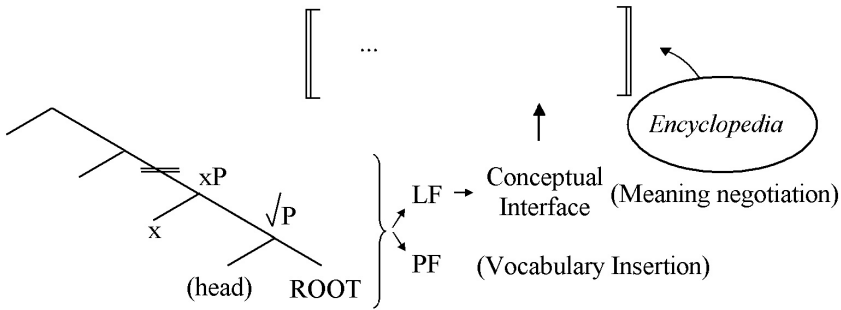
After that, it may be possible to derive further structure, which, as soon as another cyclic domain is determined, is again shipped off to PF and LF.

4   The structure of semantically motivated signs

In this section, I will focus on the structure of semantically motivated signs in NGT. First, let us look at the semantically motivated NGT sign in (4):

(4)   *NGT*

LONG.THIN.STRAIGHT.ENTITY- REPEATEDLY.MOVE.UP&DOWN-MOUTH

"toothbrush" / "to brush teeth"

This sign contains a meaningful handshape, that represents an entity that is characteristically long, straight and thin; a meaningful location: the mouth; and a meaningful, repeated up-and-down movement. Although it is translated as *toothbrush* or as *to brush teeth* in English, it has a componential meaning "long, straight & thin entity repeatedly moves up and down near the mouth". None of the components seems to have a derivational or inflectional function, although all of the components contribute to the meaning of the sign. Therefore, this sign must be a *root compound*, in which the roots are expressed by the (meaningful) components. The sign appears to be exocentric, that is, there is no clear semantic head. The sign can be used as a noun and a verb, depending on the context. It is morphologically headless.

I propose a derivation for this sign, using the DM framework, as follows. First, a morphosyntactic feature bundle [+move up&down repeatedly] is merged. Since it is merged

at the base of the structure, it functions as a root. Another morphosyntactic feature bundle, consisting of the features [+long, +thin, +straight] is merged, also functioning as a root. The structure forms a rootPhrase (√P). Then, yet another morphosyntactic feature bundle [+mouth] is merged, forming another rootPhrase.[6] At that point in the derivation, a category node (little x) is merged. This is illustrated in (5).

(5)
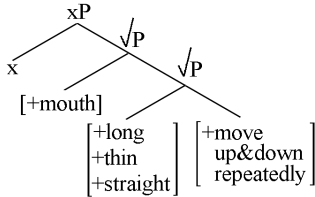
Depending on whether the category node is a little n or a little v, the structure receives the grammatical category Noun or Verb, which elegantly explains the ambiguity in the grammatical category of this sign. Merger of the category node forms the boundary of a cyclic domain, where the structure built so far is shipped off to PF and LF for Vocabulary Insertion and Meaning Negotiation.

A subset of the Vocabulary Items in NGT is in (6):

(6)

|		
ℑ	↔	[+ear]
ᔇ	↔	[+mouth]
loc$_{signer}$, loc$_x$, loc$_y$, etc.	↔	[loc]
	↔	[+straight] / [+animate] / [+finger]
	↔	[+straight, +flat] / [+hand]
	↔	[+manipulated knife] / [+thumb]
/ [7]	↔	[+legged] / [+index & middle finger]
⇕	↔	[+move up&down repeatedly]
⇨ , ᔰ , etc.	↔	[+DIR][8]

---

6   I do not have evidence for this or any particular order of merger of these morphosyntactic feature bundles. For the moment I assume this order.

7   These handshapes appear to be phonetic variants in NGT (Crasborn 2001, Zwitserlood 2003).

8   I follow Meir (2002) in using *DIR* for a morpheme that indicates a directed (or path) motion.
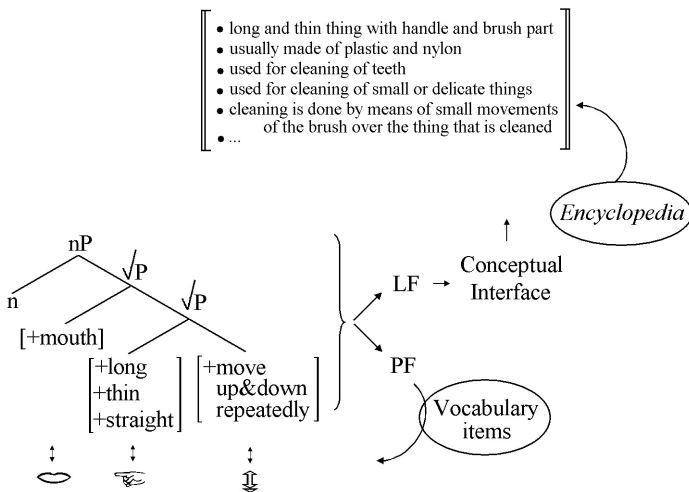
These Vocabulary Items compete for insertion into the terminal nodes of the derivation built so far, in this case when a cyclic domain is formed in the structure in (5) by merger of the category node little n. Starting at the lowest node, the Vocabulary item with the features [+move up&down repeatedly] (⇕) will be inserted. For the sister node with the features [+long, +thin, +straight], the (underspecified) Vocabulary items with the features [+straight] (☝) and [+straight, +flat] (✋) compete for insertion. Although the latter is more highly specified, its feature [+flat] does not match the features in the terminal node, and therefore cannot be inserted. Thus, the Vocabulary item ☝ is inserted. Finally, the Vocabulary item with the feature [+mouth] is inserted. This is illustrated in (7):

(7)

nP
√P
n   √P
[+mouth]
[+long +thin +straight]   [+move up&down repeatedly]

PF
Vocabulary items
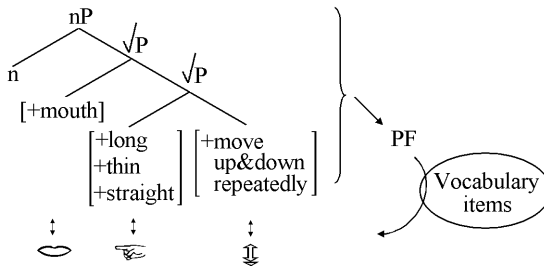
When the derivation is shipped off to LF, and the Conceptual Interface, meaning is negotiated using the Encyclopedia (List C), as illustrated in (8):

(8)

- long and thin thing with handle and brush part
- usually made of plastic and nylon
- used for cleaning of teeth
- used for cleaning of small or delicate things
- cleaning is done by means of small movements of the brush over the thing that is cleaned
- …

Encyclopedia

Conceptual Interface

LF →

nP
√P
n   √P
[+mouth]
[+long +thin +straight]   [+move up&down repeatedly]

PF
Vocabulary items

Many signs such as the one illustrated here are glossed with (often monomorphemic) words (which may have enhanced the idea that the signs are monomorphemic). Neverthe-

less, these signs should be seen as compositional in meaning, thus "long.thin.straight.entity-repeatedly.move.up&down-mouth", as in (4). Sign languages have often been compared to polysynthetic spoken languages. Polysynthetic languages not only have morphologically (very) complex verbs; nouns can be built up from roots and affixes as well, as we can see in the examples from the polysynthetic language Mohawk (from Michelson 1973) below:

(9)

    a.   yenahkwakuhrékstha?   Mohawk

ye	nahkwa	kuhrék	st	ha?
INDEF.SU	drum	hit	INSTR	HAB

        "It is usually used for hitting a drum" ⟶ *"drumstick"*

    b.   yakotiyanerúhstha?

yakoti	yanerú	hst	ha?
3PL.OB	feel spooky	CAUS	HAB

   *"It usually causes people to feel spooky"* ⟶ *"ghost"*

I suggest that, similar to the NGT and Mohawk examples above, many NGT signs have a morphologically complex structure. The handshape(s), location(s) and movement in these NGT signs do not merely Spell Out the phonological features as such, but Spell Out the phonological features of morphological feature bundles. In other words, in many signs in NGT, the sign components should not be considered as mere phonemes, since they also function as (lexical) morphemes.

Besides semantically motivated signs in which all components function as morphemes, NGT has also signs in which only one or two of the components function as such.. An example is the (general) sign for "to operate / operation". In this sign, illustrated in (10b), the hand (✍) represents a hand manipulating a knife and the knife itself, and the (straight) movement represents the motion made with it in order to make an incision[9]. There is no (meaningful) location. This means that the sign is not pronounceable, since it does not obey to the minimal requirements to the surface form of signs, as stated in section 2. Therefore, we must account for the fact that the signs can be pronounced after all. I suggest that there are two solutions. The first way in which pronunciation of such a sign becomes possible is by merger of an extra morphosyntactic feature bundle, that is Spelled Out with the phonological features that are still missing. For instance, a morphosyntactic feature bundle for a body part in the NGT sign for "to operate / operation": [+hand] or [+stomach] can be merged. If the signer indicates that the body part that is being operated upon is a hand, this surfaces as the sign in (10a).
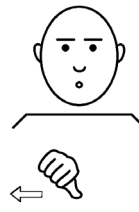
---

9   In my corpus, apart from the signs indicating various types of surgery, the ✍ handshape is also used in the meaning of knife + manipulation of knife, in the NGT signs for "(to) butcher", "to shave", and "auto mutilation".

(10)a.
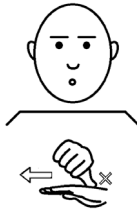
move-manip.knife-hand

"incision in hand / incise hand"

b.

move-manip.knife

"to operate / operation"

The sign is derived as follows. A morphosyntactic feature bundle [+DIR] is merged. Subsequently, merger of another morphosyntactic feature bundle [+manip.knife] is merged. If, at that point in the derivation, a category node is merged, the structure cannot be pronounced after Spell-Out because it violates the minimal phonological requirements of a sign: there are no phonological features for place of articulation. However, the signer can specify a body part on which the manipulated knife acts by merger of a morphosyntactic feature bundle for this body part (in the given case [+hand]). After merger of a category node, the structure is shipped off to LF and PF. Insertion of Vocabulary items that spell out movement, handshape *and* place of articulation features takes place. The sign obeys the minimal requirements (and does not disobey the maximal requirements) on the surface form of a sign and, thus, it can be pronounced. The structure of the sign is illustrated in (11).

(11)
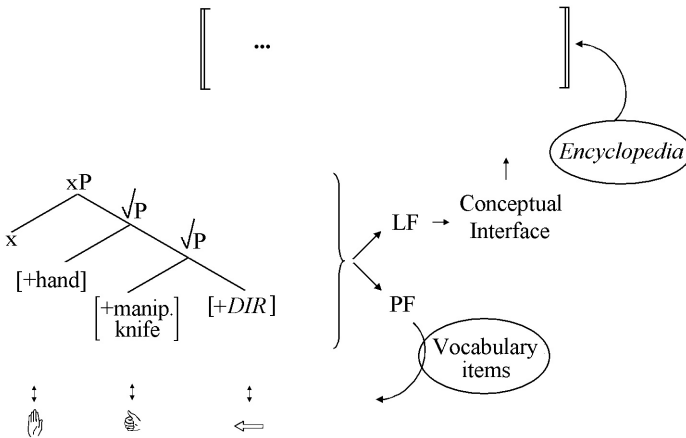
A second way to render such a sign pronounceable is by insertion of phonological features with a default value. So far, in NGT default values for handshape appear to be 🖐, 🖐, 🖐, and 🖐, and for place of articulation the default value appears to be the space in front of the signer's torso, or "neutral signing space" (Van der Kooij 2002). In the present example, in case the signer does not want or need to convey a specific body part that is being operated on, the default locus (neutral signing space) is used in Spell-Out, which results in a surface form of the sign as in (10b).

So far, I have focused on the structure of signs below little x. Let us now extend this to the structure *above* little x. As I have shown above, feature bundles merged below little x function as roots, and, thus, have a lexical function. Feature bundles merged *above* little x function as affixes, and these have a *grammatical* function (e.g. agreement marking). I will illustrate the derivation of a semantically motivated agreement verb: the sign for "to fax" in NGT. The citation form of this sign is shown in (12a), an inflected form in (12b).

(12)a.   b.
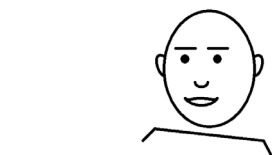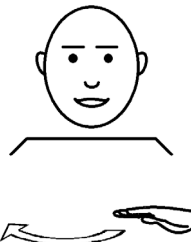

move-straight.flat.entity   LOC$_x$-move-straight.flat.entity-LOC$_y$

"fax / to send a fax"   *"She sends him a fax."*

The derivation of this signs starts with merger of the morphosyntactic feature [+DIR], which functions as a root, since it is merged at the base of the derivation. An internal argument node, with φ-features, is merged as its sister. Note that the φ-features consist of two types of features: features for location *and* features for classifier. Both types of features must be provided for, since agreement may need to be spelled out by particular loci in signing space or by particular classifier handshapes. This is done by posing morphosyntactic feature bundles for locus (that will be inserted with Vocabulary items for particular loci in signing space), and classifier (that will be Spelled Out with handshapes).[10] The structure now forms a rootPhrase. Another morphosyntactic feature bundle [+straight, +flat] is merged (representing a sheet of paper), forming another rootPhrase. Then, a category node (little v) is merged. Herewith, the boundary of a cyclic node is determined, and the structure is shipped off to PF and LF. At LF and the level of the Conceptual Interface the meaning is negotiated. At Spell-Out, Vocabulary Items are inserted, subject to the principle of Competition for Insertion. The terminal root nodes are inserted with phonological material for movement and handshape, according to the subset of Vocabulary items in (6). The sign is, as yet, unpronounceable, because it has no phonological features for place of articulation. Therefore, the default place of articulation (neutral signing

---

10 For detailed argumentation for the double specification of φ-features, see Zwitserlood (2003).

space) is inserted to result in the citation form in (12a). The derivation until this point is illustrated in (13):

(13)
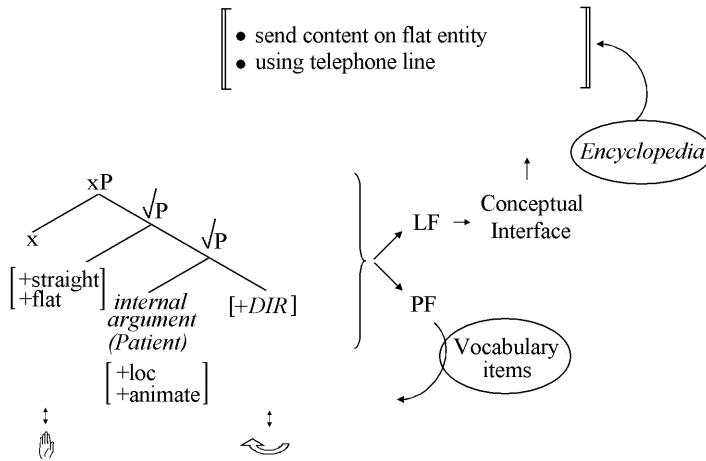
However, spelling out of default place of articulation values is not the only solution. If the category node is little v, it is also possible to further derive the structure by merger of an external argument (with φ-features for classifier and locus) and, subsequently, agreement nodes. The φ-features of the arguments are copied onto the agreement nodes. Then, at some further point in the derivation, another cyclic domain is defined and the structure is once more shipped off to LF and PF. In the process of Spell-Out, phonological features are inserted into the terminal Agreement nodes, according to the subset of features in (6) above. The Agreement nodes hold morphosyntactic features for location and classifier, as a result of which there are two possibilities for Vocabulary Insertion: insertion of phonological features for handshape or insertion of locus features. Recall that the structure has already been inserted with phonological features for handshape and movement at a previous level. This means that the sign already has handshape features, and that insertion of the Vocabulary item that is connected to animacy features (✍) would lead to a sign that violates the maximal phonetic constraints on a sign: the sign cannot have two values for handshape at the same time. However, the structure does not have phonological specifications for place of articulation at this point, for which reason locus features are inserted. This is illustrated in (14).

265

(14)

$$
\begin{array}{c}
\left[\!\left[\quad\ldots\quad\right]\!\right] \\
\text{Encyclopedia}
\end{array}
$$

$$\text{LF} \rightarrow \text{Conceptual Interface}$$

$$\text{PF}$$

AgrS $\begin{bmatrix} +\text{loc} \\ +\text{animate} \end{bmatrix}$ AgrO $\begin{bmatrix} +\text{loc} \\ +\text{animate} \end{bmatrix}$ *external argument (Patient)* vP

v $\sqrt{P}$

$\begin{bmatrix} +\text{loc} \\ +\text{animate} \end{bmatrix}$ $\begin{bmatrix} +\text{straight} \\ +\text{flat} \end{bmatrix}$ *internal argument (Patient)* $\sqrt{P}$ $[+\text{DIR}]$

$\begin{bmatrix} +\text{loc} \\ +\text{animate} \end{bmatrix}$

copy *copy*

Vocabulary items

loc_x loc_y
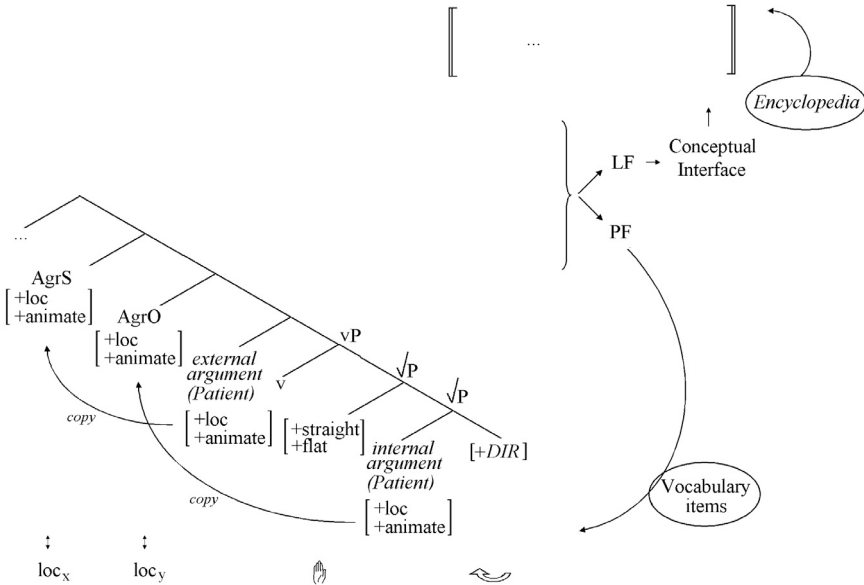
The sign now obeys the minimal phonetic requirements on the surface form of signs (without violating the maximal requirements). The principles of DM, combined with the particular requirements of the sign language phonetic interface, thus explains the morphological structure of this and other complex NGT signs, the agreement possibilities of signs, and their surface form.

5 The structure of classifier predicates versus the structure of motivated signs

I will now discuss the structure of a classifier predicate, and later in this section, compare the structure of this predicate with that of a motivated sign that is similar in form (but different in structure and characteristics). The signs I will discuss are the NGT signs for "escalator" and "legged.entity-move.up" in (2).

The derivation of the structure of the classifier predicate for "legged.entity-move.up" is partly similar to that of the sign for "to fax": a morphosyntactic feature bundle [+DIR] is merged, which functions as a root and projects an internal argument: a Theme (referent in motion).[11] This argument has φ-features for classifier and locus, as described in the previ-

---

11 Following Benedicto & Brentari (2004) for ASL, I assume that all NGT classifier predicates are basically unaccusative. This assumption is based on the fact that all NGT classifier predicates in my data appear to be subject to the transitivity alternation test for unaccusativity, described in Levin & Rappaport Hovav (1995). Other unaccusativity tests provided there (for spoken languages) and in Benedicto & Brentari (2004) (for ASL) are as yet inconclusive or unapplicable.

ous section. The structure forms a rootPhrase. Two more internal arguments are merged: a Source and a Goal. These arguments have φ-features for locus only, because they always express locations in space.[12] At that point in the derivation the category node little v is merged, creating a cyclic domain boundary and the structure is shipped off to LF and PF. Vocabulary items from the subset in (6) are inserted into the terminal nodes. Since only phonological features for movement can be inserted into the terminal root node, the sign at this stage of the derivation is still unpronounceable. The derivation so far is given in (15):
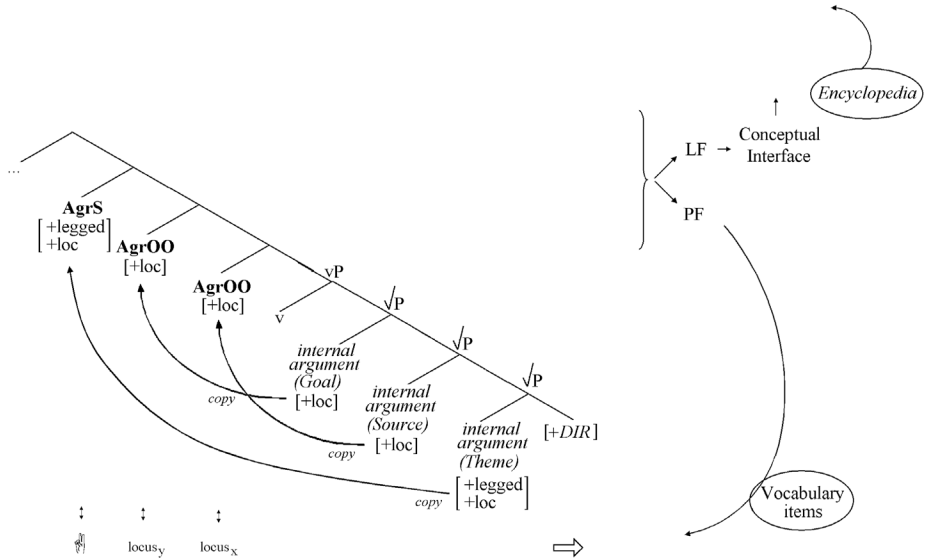
(15)
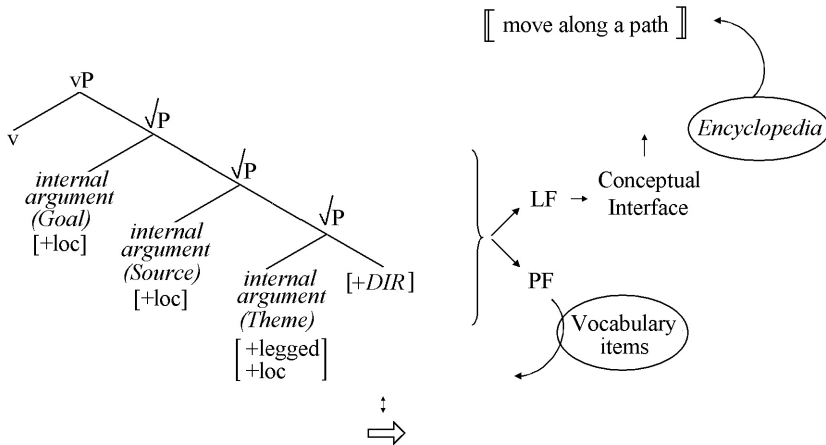
Further derivation merges agreement nodes: nodes for agreement with Source and Goal, which I will both call AgrOO (agreement with Oblique Object), and a Subject agreement node. The φ-features of the arguments are copied onto the respective agreement nodes. The derivation is, once more, shipped off to LF and PF. Vocabulary items compete for insertion into the terminal nodes during the process of Spell-Out. The AgrOO nodes contain only φ-features for locus, thus, only phonological location features can be inserted. The AgrS node, in contrast, contains φ-features for both classifier and locus. Since the sign already has the maximum of locations, insertion of locus features would violate the maximal restrictions on the surface form of a sign. Therefore, phonological features for handshape are inserted, matching the classifier features. This part of the derivation is illustrated in (16):

---

12 I diverge here from previous work (Zwitserlood 2003), where I claim that all arguments are connected with both classifier and locus features, because it has become clear that Source, Goal and Location arguments always are connected to locations in signing space, never to classifiers.
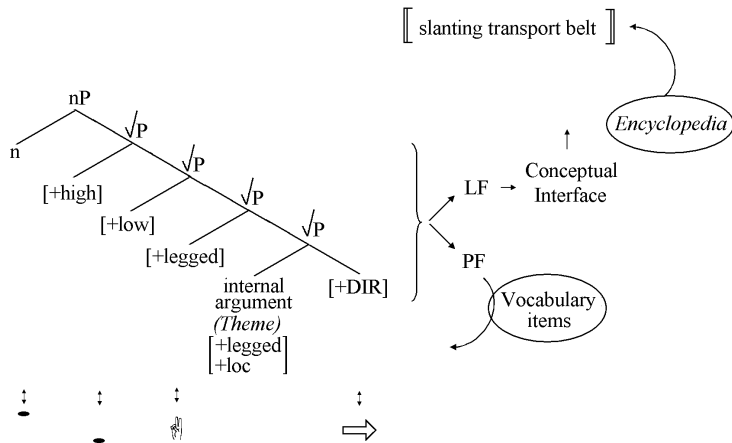
(16)

AgrS
[+legged]
[+loc]

AgrOO
[+loc]

AgrOO
[+loc]

vP

v

√P

√P

√P

internal
argument
(Goal)
[+loc]

copy

internal
argument
(Source)
[+loc]

copy

internal
argument
(Theme)
[+legged]
[+loc]

[+DIR]

copy

locus_y   locus_x

LF → Conceptual
        Interface

PF

Encyclopedia

Vocabulary
items

⟹

The minimal phonological requirements for signs are met without violation of the maximal phonological requirements.

Let me, finally, compare the structure of the classifier predicate with that of its phonologically similar root compound, viz. the sign for "escalator", perhaps better interpreted as "low-move-legged.entity-high". The derivation of this sign starts with merger of the morphosyntactic feature bundle [+DIR], functioning as a root. This root merges with an internal argument, forming a rootPhrase. Three more feature bundles are merged: [+legged], [+high], and [+low]. At that point in the derivation, a category node is merged, say little n, which determines a cyclic node. The structure is shipped off to LF and the Conceptual Interface for interpretation, and to PF. The insertion of Vocabulary items into the terminal nodes during the process of Spell-Out is illustrated in (17):

(17)

⟦ slanting transport belt ⟧ → *Encyclopedia*

nP

n   √P

[+high]   √P

[+low]   √P

[+legged]   √P

internal argument *(Theme)* [+legged +loc]   [+DIR]

LF → Conceptual Interface

PF

Vocabulary items

Note that the morphosyntactic feature bundles that are inserted with phonological features for handshape and locus are merged *below* little x, in contrast to the classifier predicate described above. Because of this, they have a different function. They function as lexical elements (roots) in the semantically motivated sign, whereas they are functional elements (agreement markers) in the classifier predicate.

We see now how it is possible that in NGT classifier predicates co-exist with semantically motivated signs, and how semantically motivated signs and classifier predicates can have a similar surface form, but different grammatical characteristics. The main point is that NGT does not (only) have a productive process of classifier predicate formation, but that the sign formation processes in NGT allow merger of morphosyntactic feature bundles *below* and *above* little x, which explains the differing grammatical characteristics of classifier predicates and semantically motivated signs.

6   Summary and conclusions

In this paper I have argued why semantically motivated signs should be analysed as morphologically complex signs, in which the components form morphemes that can be combined systematically by signers to form new signs. The meaning of these signs is compositional (although they seem exocentric, and the structures are morphologically headless). I have proposed an analysis of morphologically complex signs, where morphology occurs below the level of the whole sign (using the framework of Distributed Morphology). Previously, this was done for classifier predicates and agreement verbs only; my analysis, in contrast, accounts for the internal morphology of signs in which components function as roots and signs in which unspecified phonological features at the level of the verb stem (viz. the cyclic domain constituted by merger of little x) allow Spelling Out agreement morphology with phonological features. The latter include agreement verbs and classifier predicates, in which features for locus (agreement verbs) and features for handshape and locus (classifier predicates) Spell Out the agreement possibilities. I

have shown how the morphological structure of classifier predicates and that of semantically motivated signs differ, although their surface form may be similar.

An interesting result of my analysis is that it is no longer necessary to distinguish between the different types of verbs observed in many sign languages (Padden 1988, Bos 1990 and others), viz. plain verbs, agreement verbs and spatial verbs. Posing these verb types may have been descriptively adequate, but is not explanatory adequate. In the analysis proposed here, the agreement possibilities (none, loci and classifiers) automatically follow from the derivations of the verbs. *Plain verbs* do not show agreement because they are fully specified for phonological features before Spelling Out of morphological feature bundles in the terminal Agreement nodes has taken place. In the further derivation, the morphosyntactic feature bundles of the arguments may be copied onto Agreement nodes as described in sections 4 and 5, but the terminal Agreement nodes may not be inserted with further phonological material because this would violate the maximal constraints on the surface form of a sign. Hence, an Elsewhere case applies and no phonological material is inserted. *Agreement verbs* (including a subset of spatial verbs, and directional verbs and location agreement verbs as proposed by Bos 1990), are not fully specified for phonological features after the first instance of Spell-Out; features for one or two loci can be inserted when the derivation is once again shipped off to PF. The third verb type, viz. the subset of *spatial verbs* that consists of classifier predicates, as described in section 5, is at the first instance of Spell-Out only inserted with phonological features Spelling Out a movement. Further derivation ensures merger of Agreement nodes and copying of the features of the arguments onto those nodes. Vocabulary insertion of handshape and location features into these terminal Agreement nodes when the next cyclic domain is defined is possible without violation of the minimal and maximal phonetic requirements on the surface form of signs.

This proposal needs elaboration still. So far I have left hand orientation and non-manual components out of the discussion. Also, the role of movement intensity (fast, slow, tense) and aspect in the structure of motivated signs and classifier predicates needs to be worked out in relation to the analysis proposed here (following work by Wilbur to appear). It is important to explore whether and to what extent morphological complexity of semantically motivated signs is accessible and sign formation processes are used in (first and second) language acquisition. It will, furthermore, be interesting to follow the processes of lexicalisation that occur in various types of signs, especially with respect to (new) possibilities of showing verb agreement.

I have indicated that many signs that in general are considered to be lexicalised may be morphologically complex. Of course, it is not my intention to state that there are no lexicalised signs in NGT. As in all languages, words and signs that are formed according to productive rules can lexicalise, there may be lexicalised forms that derive from semantically motivated signs and from classifier predicates in NGT. It is difficult to make generalisations, and it would be best to judge each form in its own merit, preferably based on several types of evidence.

7 References

Bauer, L. 1983. *English Word-formation*. Cambridge: Cambridge University Press.

Bauer, L. 1988. *Introducing Linguistic Morphology.* Edinburgh: Edinburgh University Press.

Benedicto, E. & D. Brentari. 2004. Where did All the Arguments Go? Argument-Changing Properties of Classifiers in ASL. *Natural Language and Linguistic Theory* 22: 743-810.

Bos, H.F. 1990. Person and Location Marking in Sign Language of the Netherlands: Some Implications of a Spatially Expressed Syntactic System. In *Current Trends in European Sign Language Research. Proceedings of the 3rd European Congress on Sign Language Research. Hamburg, July 26-29, 1989*, eds. S. Prillwitz and T. Vollhaber, 231-246. Hamburg: Signum Press.

Brennan, M. 1990. *Word Formation in British Sign Language*. Stockholm: University of Stockholm.

Brentari, D., & J. Goldsmith. 1993. Secondary Licensing and the Non-dominant Hand in ASL Phonology. In *Current Issues in ASL Phonology*, ed. G. Coulter, 19-41. New York, San Francisco, London: Academic Press.

Brinton, L.J. & E. Traugot. 2005. *Lexicalization and Language Change: Research Surveys in Linguistics*. Cambridge: Cambridge University Press.

Crasborn, O. 2001. *Phonetic Implementation of Phonological Categories in Sign Language of the Netherlands*. Utrecht: LOT Dissertation Series.

Fernald, T. & D. Napoli. 2000. Exploitation of Morphological Possibilities in Signed Languages: Comparison of American Sign Language with English. *Sign Language and Linguistics* 3: 3-58.

Glück, S. & R. Pfau. 1998. On Classifying Classification as a Class of Inflection in German Sign Language. In *Proceedings of ConSole VI*, eds. T. Cambier-Langeveld, A. Lipták & M. Redford, 59-74. Leiden: SOLE.

Grote, K. & E. Linz. 2003. The Influence of Sign Language Iconicity on Semantic Conceptualization. In *From Sign to Signing. Iconicity in language and literature*, eds. M. Nanny & O. Fischer, 23-40. Amsterdam/Philadelphia: John Benjamins.

Halle, M. & A. Marantz. 1993. Distributed Morphology and the Pieces of Inflection. In *The View from building 20: essays in linguistics in honor of Sylvain Bromberger*, eds. K.L. Hale& S.J. Keyser, 111-176. Cambridge, MA.: MIT Press.

Harley, H. & R. Noyer. 2003. Distributed Morphology. In *The Second Glot International State-of-the-Article Book*, eds. L. Cheng & R. Sybesma, 463-496. Berlin: Mouton de Gruyter.

Johnston, T. & A. Schembri. 1999. On Defining Lexeme in a Signed Language. *Sign Language and Linguistics* 2: 115-185.

Kooij, E. van der. 2002. *Phonological Categories in Sign Language of the Netherlands. The Role of Phonetic Implementation and Iconicity.* Utrecht: LOT Dissertation Series.

Levin, B. & M. Rappaport Hovav. 1995. *Unaccusativity: at the Syntax-Lexical Semantics Interface.* Cambridge, MA.: MIT Press.

Marantz, A. 2001. Words. Paper presented at the West Coast Conference on Formal Linguistics XX. Ms. University of Southern California, Los Angeles.

McDonald, B. 1983. Levels of Analysis in Signed Languages. In *Language in Sign: an International Perspective on Sign Language*, eds. J. Kyle & B. Woll, 32-40. London/Canberr:, Croom Helm.

Meir, I. (2001). Verb Classifiers as Noun Incorporation in Israeli Sign Language. In *Yearbook of Morphology 1999*, eds. G. Booij & J. van Marle, 299-319. Dordrecht: Kluwer Academic Publishers.

Meir, I. 2002. A Cross-Modality Perspective on Verb Agreement. *Natural Language and Linguistic Theory* 20: 413-450.

Michelson, G. 1973. *A Thousand Words of Mohawk*. Ottawa: National Museum of Man, National Museums of Canada.

Newport, E. 1982. Task Specificity in Language Learning? Evidence from Speech Perception and American Sign Language. In *Language Acquisition: the State of the Art*, eds. E. Wanner & L. Gleitman, 450-486. Cambridge, Mass.: Cambridge University Press.

Padden, C. 1988. *Interaction of Morphology and Syntax in American Sign Language*. New York: Garland.

Sandler, W. & D. Lillo-Martin. 2006. *Sign Language and Linguistic Universals*. Cambridge: Cambridge University Press.

Schembri, A. 2003. Rethinking 'Classifiers' in Signed Languages. In *Perspectives on Classifiers in Sign Language*, ed. K. Emmorey, 3-34. Mahwah, NJ: Lawrence Erlbaum Associates.

Supalla, T.R. 1980. Morphology of Verbs of Motion and Location in American Sign Language. In *Proceedings of the Second National Symposium of Sign Language Research and Teaching, 1978*, eds. F. Caccamise & D. Hicks, 27-45. Silver Spring, MD: National Association of the Deaf.

Sutton-Spence, R. & B. Woll. 1999. *The linguistics of British Sign Language: an introduction.* Cambridge: Cambridge University Press.

Wilbur, R. 1987. *American Sign Language: Linguistic and Applied Dimensions*. Boston, MA: Little, Brown and Company.

Wibur, R. 2003. Representations of Telicity in ASL. *Papers from the Annual Regional Meeting of the Chicago Linguistic Society* 39. Vol.1, pp. 354-368.

Zwitserlood, I. 2003. *Classifying Hand Configurations in Nederlandse Gebarentaal (Sign Language of the Netherlands)*. Utrecht: LOT Dissertation Series.

Zwitserlood, I. & I. van Gÿn. 2006. Agreement Phenomena in Sign Language of the Netherlands. In *Arguments and Agreement*, eds. P. Ackema, P. Brandt, M. Schoorlemmer & F. Weerman, 195-229. Oxford: Oxford University Press.