

Handwaving and headshaking? On the linguistic structure of sign languages

Roland Pfau (University of Amsterdam)
r.pfau@uva.nl

1 Introduction

Watching a group of signers in communication with each other, the naïve observer may be tempted to assume that these people are basically waving their hands at each other while grimacing. From time to time, the observer may come across a hand movement the meaning of which he (thinks he) can guess and hence, he may conclude that this mode of communication is highly iconic, basically, an elaborate version of pantomime. The signers seem to understand each other well, they laugh and they nod, but surely, this sign language does not allow them to talk about abstract thoughts or highly complex theoretical topics. That's a clear disadvantage, the observer may think, but on the other hand, isn't this shortcoming made up for by the fact that deaf people can communicate with each other all over the world. After all, there is only one sign language, right?

Reflections like these have given rise to numerous popular misconceptions about sign languages (SLs). It is my aim in this paper to convince the reader that all of these fairly widespread assumptions are wrong: SL is by no means a form of pantomime, it is not universal, and it does allow for the expression of abstract concepts and ideas. My focus will be on linguistic properties of SLs. Before turning to linguistic issues, however, in Section 2, I will say a few words about the linguistic environment in which deaf children grow up, about deaf communities, and the specific experiences of deaf people. I will then introduce selected aspects of SL typology, that is, areas where SLs have been found to differ from each other (Section 3). Sections 4 to 6 are devoted to the linguistic levels phonology, morphology, and syntax. In all three sections, I discuss examples from various SLs that show that languages in the visual-gestural modality exhibit complex and rule-governed grammatical structures at all levels of linguistic description. At various points in the discussion, SLs will be compared to each other and to spoken languages.

2 Deaf children and deaf communities

It is estimated that approximately one in a thousand people (0,1 %) is pre-lingually deaf, that is, is either born deaf or became deaf before the age of one. Clearly, due to the inaccessibility of auditory input, deaf people cannot acquire a spoken language in a natural way. Sign language is the mode of communication that best fits their needs. SLs are articulated with the

hands as well as (parts of) the face and body and they are perceived by the eyes; that is, they are visual-gestural languages. Extensive research has shown that SLs are acquired by children in very much the same way as spoken languages are acquired by hearing children. Deaf children reach important acquisition milestones (e.g. first words, first two-word utterances) around the same time as their hearing peers (Newport & Meier 1985; Morgan & Woll 2002) and they make similar mistakes, such as overgeneralizations and phonological substitutions and omissions (Siedlecki & Bonvillian 1993; Conlin et al. 2000; Meier 2002a).

Approximately 95% of deaf children have hearing parents who do not know sign language. Without access to a natural sign language from birth, these children will only learn to sign once they get into contact with deaf peers at pre-school or school. Occasionally, deaf kids that grow up in hearing families without access to a sign language may develop home-sign systems, comparably simple communication systems that do not exhibit the characteristics of fully-fledged natural languages (Morford 1996; Goldin-Meadow 1999). However, as soon as a number of deaf kids is brought together (e.g. in a boarding school), a natural SL may develop, as has been quite extensively documented for a deaf school in Managua (Nicaragua). In this setting, after only a couple of years, grammatical structures characteristic of natural SLs had developed (Kegl et al. 1999).

There are some interesting cases of village communities with a high incidence of genetically transmitted deafness. In at least some of these communities, deafness is not (or less) stigmatized and (part of) the hearing population is also fluent in the local SL; for instance, Adamorobe in Ghana (Nyst 2007), Desa Kolok in Bali (Marsaja 2008), and a Bedouin community in the Negev desert in Israel (Kisch 2004; Sandler et al. 2005); for different types of deaf communities see also Woll & Ladd (2003).

Interestingly, many Deaf people don't see themselves as handicapped (Lane 2002) but rather consider themselves members of a linguistic minority with its own culture, that is, with values, customs, and traditions distinct from those of the hearing community, with its own way of artistic expression (e.g. poetry), and, of course, with its own language. This culture is referred to as 'Deaf culture' – with capital *D* in order to distinguish the cultural connotation of the term 'Deaf' from the medical meaning of the term 'deaf' (Padden & Humphries 1988, 2005; Ladd 2003). Crucially, not everyone who is deaf is also Deaf. Conversely, people can be Deaf without being deaf; the latter may hold, for instance, for hearing children of Deaf parents (CODAs: children of deaf adults) who grew up using sign language and who got into contact with Deaf culture at a young age.

3 Sign language typology

The natural SLs used in Deaf communities all around the world were not designed on drawing boards but developed naturally through continued use in these communities. Contrary to

common belief, there is not just one sign language that would be used all around the globe. Rather, there are probably as many distinct SLs as there are deaf communities. Still, SLs may be related to each other due to historical contact. American SL (ASL), for instance, has been influenced by French SL because the French teacher Laurent Clerc introduced teaching methods for the deaf in the United States and founded the first school for the deaf in Hartford, Connecticut, in 1817. Also, the SLs of Great Britain and its former colonies Australia and New Zealand have been shown to be closely related to each other. Based on a lexical comparison, Johnston (2003) even claims that these three SLs should be considered dialects and not distinct languages.

First of all, SLs differ from each other at the lexical level. The two examples in (1) from ASL and SL of the Netherlands (*Nederlandse Gebarentaal*: NGT), respectively, illustrate this point. In (1a), you find the signs for ‘Germany’. Both these signs are motivated: the NGT sign refers to a spike on a German 19th century police helmet, while the ASL one is related to the double eagle found on the German (pre-unification) flag. Most users of the two SLs, however, are not aware of this historical motivation; that is, these signs are no longer transparent. In (1b), the respective signs for the verb ‘to answer’ are given. While still being different from each other, these signs clearly resemble each other more than the ones in (1a). Both are articulated at the chin, which is not surprising given that they refer to a verb of communication, but they have different handshapes. In addition, the ASL sign is two-handed (see Section 4).¹

(1) a.



GERMANY
(NGT)



GERMANY
(ASL)

b.



ANSWER
(NGT)

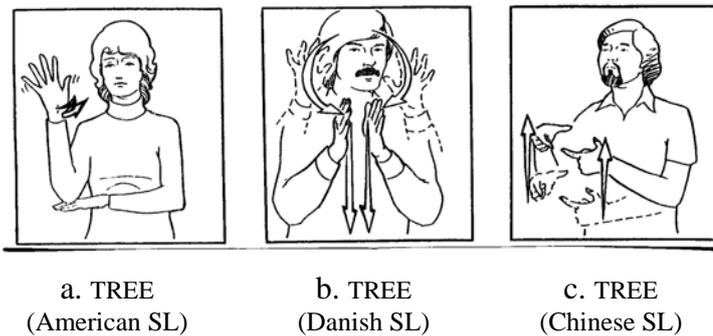


ANSWER
(ASL)

The examples in (1b) already illustrate that signs or parts of signs may be iconic, in the sense that they represent the form of an object (e.g. HOUSE, TREE) or how an action is performed (e.g. GIVE, EAT). Obviously, languages in the visual-gestural modality have a higher potential

for expressing concepts iconically than languages in the oral-auditory modality. In oral languages, iconicity is constrained to onomatopoeics (e.g. animal sounds like *miaow*) and possibly sound symbolism (e.g. the nasal-stop cluster in the verb *to bump*). But even iconic signs may differ from SL to SL. Consider, for instance, the signs TREE in ASL (2a), Danish SL (2b), and Chinese SL (2c) (Klima & Bellugi 1979:21). All three signs are fairly iconic but focus on different aspects of the entity they refer to: the tree as a whole, its outline, and its trunk, respectively. Moreover, signs are subject to historical change, that is, they may become less iconic in the course of time (Frishberg 1975).

(2)



Secondly, SLs also differ from each other at the syntactic level, for instance, with respect to basic word (sign) order. In spoken languages, the two most common word orders are SVO and SOV. English, for instance, has basic SVO-order (3a) while Turkish is underlyingly SOV (3b) (note that “*” marks an utterance as ungrammatical). The same type of typological variation has been found for SLs. ASL, for instance, has been claimed to exhibit an underlying SVO-order (Neidle et al. 2000) while German Sign Language has basic SOV-order; see the examples in (4). It has to be pointed out, however, that generally, word order in SLs is quite flexible and strongly influenced by pragmatic factors. Determining the basic word order of a SL is therefore often an intricate issue (Johnston et al. 2007). Still, it is clear that, just as words in spoken languages, signs cannot be randomly combined in a sentence.²

- (3) a. English: The man eats an apple * The man an apple eats
 b. Turkish: Adam elma yi-yor * Adam yi-yor elma
 man apple eat-PRES man eat-PRES apple
- (4) a. ASL: MAN EAT APPLE * MAN APPLE EAT
 b. DGS: MAN APPLE EAT * MAN EAT APPLE

¹ The NGT signs in (1), (6a), and (8b) are taken from http://www.kegg.nl/egg_gebaren.php; the ASL signs in (1) and (6b) are taken from <http://www.aslpro.com/cgi-bin/aslpro/aslpro.cgi>.

² Notation conventions: SL examples are given in English small caps. A line above the glosses indicates which manual signs are accompanied by a particular non-manual marker. Subscript numbers refer to points in the signing space which are used for the localization of non-present referents, for pronominalization, or agreement.

Generally, the syntactic structure of a SL is not derived from, but may be influenced by the structure of the surrounding spoken language (see, for example, Nakanishi (1994) for Japanese SL).

Sign language typology is a rather young research field which has already yielded a number of interesting results. SLs, just like spoken languages, differ from each other along well-defined lines and moreover, much of the typological variation that has been described to date mirrors the variation that has found been across spoken languages (see Perniss et al. (2007) for an overview).

4 Sign language phonology

To some, it may come as a surprise that the term “phonology” is also applied to sign languages. After all, the term includes the Greek word *φωνή* (*phōnē*, ‘voice, sound’). However, in linguistics, phonology is defined as the component of grammar which investigates the smallest parts of a language which may distinguish meaning but do not bear any meaning. It will turn out that this rather abstract definition can also be applied to SLs. In other words: the definition is modality-independent.

One way to determine the phoneme (or segment) inventory of a language is by means of minimal pairs. Consider, for instance, the English word pairs in (5). In all these pairs, a difference in only element, be it a consonant (5a) or a vowel (5b), results in a difference in meaning. Hence, the distinguishing elements are phonemes of English.

- (5) a. tip – lip; house – mouse; bet – pet
 b. fool – feel; hit – hot pet – pot

Elements with a similar function can be identified in SLs. Obviously, SLs do not make use of vowels and consonants, but still, signs have an internal phonological structure comparable (but not identical) to that of spoken words; they consist of handshapes, locations, movements, and possibly non-manual elements. These sublexical parts are often referred to as the “phonological parameters” of signs (Stokoe 1960; Sandler 1989; Brentari 1998). Signs may differ from each other in only one of these parameters; in other words: these components function as phonemes. Two minimal pairs are given in (6). In NGT, the signs for GERMANY and TURKEY (6a) differ only in the handshape parameter (B-hand vs. L -hand) but share the parameters location (forehead) and movement (single contact with location). In contrast, the ASL signs SUMMER and DRY (6b) differ only in location but share the handshape (handshape change from B-hand to D-hand) and the movement (straight sideward movement) parameter.

(6) a.

GERMANY
(NGT)TURKEY
(NGT)

b.

SUMMER
(ASL)DRY
(ASL)

It has also been suggested that parameters, just like spoken language phonemes, are composed of smaller units, that is, distinctive features. For the parameter handshape, these features define which fingers are selected (e.g. [all] or [one]) and what the position of these fingers is (e.g. [open] or [closed]). A few examples for the featural composition of handshapes are provided in (7) (Sandler & Lillo-Martin 2006). Similarly, features and feature combinations have been suggested for the parameters movement and location.

(7) a. > : [all], [open]

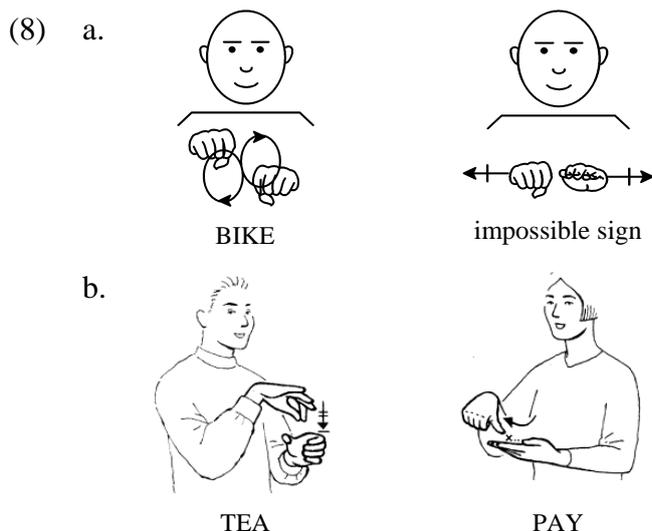
b. B : [one], [open]

c. 6 : [all], [closed], [opposed]

d. f : [radial], [ulnar], [open]

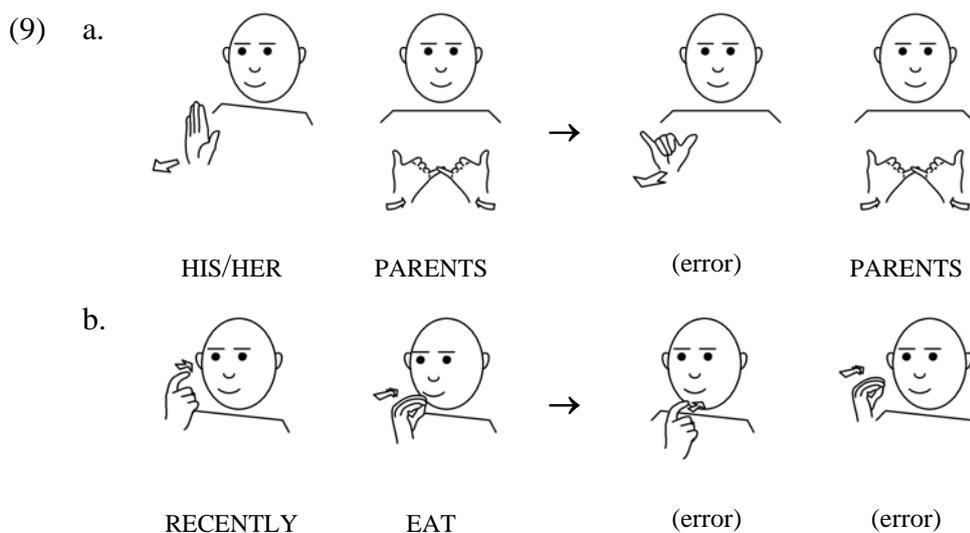
Based on criteria such as frequency, ease of articulation, and order of acquisition, unmarked handshapes (e.g. >, B, 6) can be distinguished from marked handshapes (e.g. f, #, W). Unmarked handshapes are more frequent within and across SLs and they are acquired earlier by children.

Another important phonological distinction is the distinction between one-handed and two-handed signs (see, for instance, the signs in (1)). Just as in spoken languages, phonological elements cannot be randomly combined (e.g. *mkono* is not a possible word in English, but it is in Swahili). Particularly interesting phonological constraints have been proposed for two-handed signs. For instance, in two-handed signs in which both hands move (symmetrical or alternating movement), both hands must be specified for the same handshape. This well-formedness condition, the so-called symmetry condition (Battison 1978; also see Van der Hulst 1996), is illustrated by the signs in (8a). This restriction is clearly phonological and not physical in nature. From an articulatory point of view, the impossible sign in (8a) does not pose any problems. Still, the symmetry condition seems to constrain the form of two-handed signs in all SLs studied to date.



Another phonological condition, the dominance condition, requires that in two-handed signs with two different handshapes, the non-dominant (weak) hand must be static, that is, it must function as a place of articulation. Also, it can only have one of the unmarked handshapes mentioned above. Two NGT signs of this type are given in (8b).

Psycholinguistic evidence for the existence of phonological units comes from spontaneous speech errors. In the DGS slips of the hand in (9ab), a phonological unit, namely the \bar{f} -handshape, is anticipated (Hohenberger et al. 2002:119). Compare the English slip of the tongue in (10a), a consonant anticipation. In both cases, the result is a non-existing but possible sign/word. The ASL slip of the hand in (9b) is different in two respects. First, the parameter affected in the error is location; secondly, we are dealing with a phonological exchange, not with an anticipation (Newkirk et al. 1980:175). An example of an English consonant exchange is given in (10b).



- (10) a. some funny kind → some **kunny** kind
 b. a pitch fork → a **fitch** pork

Moreover, it has recently been shown that signers also experience “Tip-of-the-fingers” states comparable to “Tip-of-the-tongue” states in spoken language. In such a state, speakers/signers are sure to know a sign/word but can only retrieve part of its phonological description from the mental lexicon. Speakers are usually able to retrieve the onset or first syllable of the word as well as its syllable structure (Brown & MacNeill 1966). Signers were found to be more likely to retrieve a target sign’s handshape and location than its movement (Thompson et al. 2005).

Just as in spoken languages, the phonological building blocks of SLs can be used creatively in language play and poetry (Klima & Bellugi 1979). SL poetry is characterized by repetition of elements (for instance, handshape alliteration), symmetry (Sutton-Spence & Kaneko 2007), and flowing movements. In addition, poetic effect may be achieved by neologisms (11a) and the use of lexical ambiguities (11b) (Sutton-Spence 2005). The sign in (11a) is not a well-formed British SL (BSL) sign. However, this sign creation beautifully illustrates the reflection of a tree in a pond (glossed as TWIN-TREES). The B-handshape in (11b) is commonly used as a classifier for upright human beings (see Section 5). The combination with a certain movement yields the meaning ‘person moving forward’. The BSL sign WHAT, however, has the same handshape and is articulated in neutral signing space with a shaking movement. In the poem, the artist plays with that ambiguity. A group of people is moving through a forest. They are insecure and are not sure what to expect. The facial expression adds to the ambiguity since it can either be interpreted as illustrating the mood of the protagonists or as the syntactic non-manual marker which accompanies wh-questions (see Section 6).



TWIN-TREES



PERSON-WALK / WHAT

(examples from British SL poems by Dorothy Miles (1931-1993))

Finally, the two articulators (i.e. the two hands) can also be employed for poetic effect, for instance, by creating a balance between the two hands or by signing two phrases simultaneously, as in (12), an NGT poem by the Dutch poet Wim Emmerik (Crasborn

2006:74). Note that despite the availability of two articulators – clearly a unique property of SLs – signing two propositions simultaneously is impossible in normal language use.

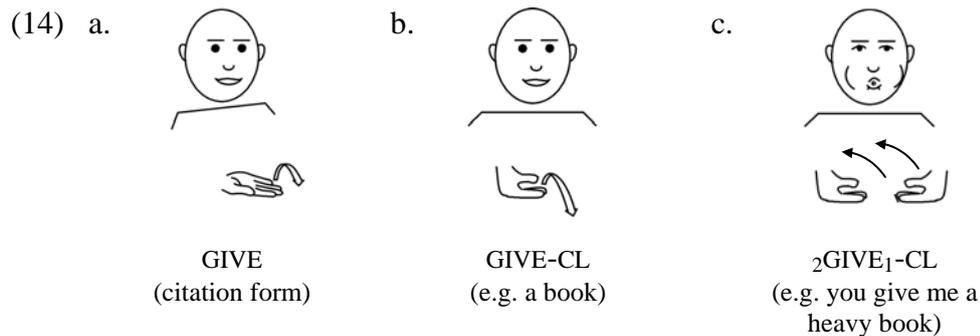
- (12) right hand: PISTOL-AT-HEAD PISTOL-SHOOT FALL-DOWN
left hand: HOPE ----- DO ----- LIFE -----
right hand: ‘Someone is shot in the head and falls down dead.’
left hand: ‘As long as there’s hope, we live.’

5 Sign language morphology

In contrast to phonology, morphology is concerned with the smallest meaningful elements of a language and their combination. Two types of morphemes have to be distinguished: free and bound morphemes (affixes). Affixes in turn come as prefixes, suffixes, and infixes (amongst others). In some spoken languages, words may consist of a considerable number of morphemes. These morphemes are usually combined in a sequential fashion. In Turkish, a highly agglutinative language, for instance, grammatical morphemes are suffixed to a stem (13a).

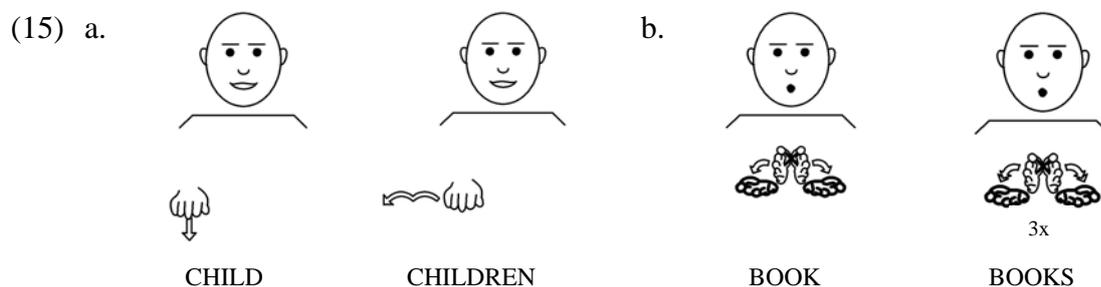
- (13) a. **in-dir-il-e-me-yebil-ecek-ler**
descend-CAUS-PASS-POT1-NEG-POT2-FUT-3.PL
‘they will be able to not be able to be lowered’
b. sing → sang → sung
foot → feet

Things are strikingly different in SLs. Signs may also be of considerable morphological complexity; however, there is only little sequential morphology (Aronoff et al. 2005). Mostly, morphological operations apply simultaneously. Consider the DGS examples in (14). In (14a), the citation form of the verb GIVE is shown. The morphologically complex forms in (14bc) are as long as the base form, that is, just like the base form, they consist of a Location-Movement-Location sequence. The specification of various parameters, however, changes. First, we observe a handshape change based on physical properties of the object that is being handled (14b). Second, the non-dominant hand is added to indicate the size of the object. Third, the direction of movement (that is, its beginning and end point) is reversed in order to express who is giving the object to whom (2nd person subject to 1st person object, in this case; see below for details). Finally, the facial expression functions as a sort of manner adverb (14c) (Pfau 2008b:169).



The result of these operations is a morphologically complex sign with a rather complex meaning. Crucially, all of the morphological operations involved apply stem-internally; there is no sequential affixation. Comparable stem-internal morphological changes do occur in English (13b) and other languages. In English, however, simultaneous morphology (e.g. ablaut) is the exception while in all SLs studied to date it is the rule.

Another frequently attested morphological operation is reduplication. In SLs, reduplication can serve various grammatical purposes; it is, for instance, used to mark aspectual distinctions such as habitual and iterative aspect (Klima & Bellugi 1979; Rathmann 2005), for the pluralization of nouns (15) (Pfau & Steinbach 2006b), and in reciprocal ('each other') constructions (Pfau & Steinbach 2003).



Interestingly, reduplication is used for exactly the same purposes in many spoken languages, that is, for iterative aspect, as in the Tzeltal (Mexico) examples in (16a), and for plurality, as in the Warlpiri (Australia) examples in (16b). Generally, in both modalities, the uses of reduplication as a grammatical phenomenon can be considered iconic in the sense that they either express a repetition of actions (aspect) or a multitude of objects (plurality).

- (16) a. pik ('to touch') → pikpik ('to touch repeatedly')
 suh ('to urge') → suhsuh ('to urge repeatedly')
- b. kurdu ('child') → kurdu-kurdu ('children')
 kamina ('girl') → kamina-kamina ('girls')

Use of the signing space in front of the body (as depicted in (17a)) plays an important role for various grammatical aspects of SLs. Locations in the signing space are employed, for example, in the realization of personal pronouns and verbal agreement.

In SLs, personal pronouns are realized by means of a pointing sign (INDEX) towards a location in the signing space (McBurney 2002). This pointing sign is usually articulated with a B-hand. For present referents (e.g. the signer and the addressee), the pointing sign targets the actual position of that referent. That is, the first person singular pronoun points towards the signer's chest (INDEX₁) while the second person pronoun points towards the addressee (INDEX₂), see Figure (17b).



In contrast, for non-present referents, an arbitrary locus must be introduced. This localization strategy is illustrated by the example in (18a). In this utterance, the signer talks about two non-present male referents. The referent MAN is localized at location 3a while the referent FRIEND is linked to location 3b. Subsequently, these loci can be used for pronominal reference, as shown in (18b), where INDEX_{3a} refers back to FRIEND by targeting the location previously associated with this referent. In contrast to, for instance, English (18c), the reference (i.e. the interpretation) of the pronoun is always unambiguous.

- (18) a. YESTERDAY MAN INDEX_{3a} FRIEND INDEX_{3b} _{3a}VISIT_{3b}
 ‘Yesterday the man visited his friend ...’
- b. REASON INDEX_{3b} SAD
 ‘... because he (the friend) is sad.’
- c. A man_i visits his friend_j because he_{i/j} is sad.

Moreover, with some verbs, locations in the signing space can be used to express agreement. This is achieved either by means of movement (19a) and/or orientation (19b) of the verb sign from the location associated with the subject towards the location associated with the object (Janis 1995; Mathur 2000; Zwitserlood & van Gijn 2006). For both verbs, the second and the fourth inflected form are illustrated in (20a) and (20b), respectively. For GIVE, the beginning and end location are given (Nederlands Gebarententrum 2002).

(19) Sign Language of the Netherlands

- a. Agreement verb (path movement): $_1\text{GIVE}_2 / _2\text{GIVE}_1 / _1\text{GIVE}_3 / _2\text{GIVE}_3 \dots$
 ‘I give to you / You give to me / I give to him/her / S/he gives to you.’
- b. Agreement verb (finger orientation): $_1\text{CALL}_2 / _2\text{CALL}_1 / _1\text{CALL}_3 / _3\text{CALL}_2 \dots$
 ‘I call you / You call me / I call him/her / S/he calls you.’

(20) a.

 $_2\text{GIVE}_1$ (‘you give to me’) $_2\text{GIVE}_3$ (‘you give to him/her’)

b.

 $_2\text{CALL}_1$
(‘you call me’) $_3\text{CALL}_2$
(‘you call him/her’)

Most SL verbs, however, are “plain” in the sense that they cannot express agreement in this way (e.g. the NGT verbs LOVE, DREAM). Different SLs have developed different means in order to express argument structure relations with plain verbs. Some SL, like e.g. ASL rely on word order in these cases; that is, word order is more flexible with agreement verbs. Other SLs, like e.g. NGT, DGS, and Taiwan SL introduce an agreement auxiliary in the context of plain verbs. This auxiliary is semantically empty; its only function is to express the agreement relation whenever the main verb is not capable of doing so (Steinbach & Pfau 2007). Also, there are a few “backwards verbs” in which movement proceeds from object towards subject location, e.g. INVITE, TAKE. It has been suggested that in all agreeing verbs, no matter whether they are regular or backward, movement proceeds from the Source toward the Goal of the action. That is, movement is determined by semantic (thematic) roles, not by grammatical roles of the verb’s arguments (Meir 2002). In regular agreeing verbs like GIVE, the thematic role Source is mapped onto the subject and the Goal role onto the object, while in backward verbs like INVITE, this mapping is reversed.

So far, we have been concerned with modulations of the movement and orientation parameter in verbs. In addition, some verbs allow for handshape modifications. In these verbs, handshapes function as morphemes, namely as classifiers (CL) that classify certain physical characteristics of an argument (Supalla 1986; Schembri 2003; Zwitserlood 2003). Here, I will briefly describe the use of two types of classifiers, i.e. Entity and Handle classifiers.

Entity classifiers refer to characteristics of the subjects in intransitive clauses. In this case, the hand *is* the referent. Both NGT sentences in (21) involve the predicate MOVE-ALONG the root of which only consists of a movement but is unspecified for handshape. In (21a), the

movement root combines with a , -hand, the CL for cars and other vehicles. In contrast, in (21b), the CL for human beings, a B-hand, finds use. In NGT, use of these classifying handshapes is obligatory.

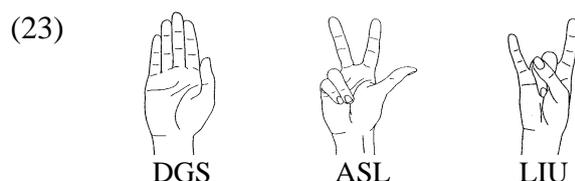
- (21) a. STREET CAR MOVE-ALONG (,)
 ‘A car drives along a street.’
 b. STREET PERSON MOVE-ALONG (B)
 ‘A person moves along a street.’

Handle classifiers have different morphosyntactic characteristics; they classify direct objects in transitive clauses. In this case, the hand does not represent the referent. Rather, it shows how the hand manipulates or handles a referent. Consider the NGT sentence pair in (22). In (22a), the # -handshape illustrates the handling of a long thin object while in (22b), the < -handshape combines with the same predicate, the agreeing verb GIVE, in order to illustrate the handling of a cylindrical object.

- (22) a. WOMAN FLOWER ₃GIVE₁ (#)
 ‘A woman gives me a flower.’
 b. WOMAN CUP ₃GIVE₁ (<)
 ‘A woman gives me a cup.’

Crucially, with both types of classifiers, the handshape does not represent a specific object (e.g. a CAR or FLOWER). Rather, it represents a class of objects with certain physical characteristics. In other words: the handshape is not an incorporated argument. It has therefore been suggested that classification is a form of agreement and that classifier handshapes realize certain features of arguments just like agreement morphemes in spoken languages do (Glück & Pfau 1997; Zwitserlood 2003; Benedicto & Brentari 2004).

While Handle CL are more iconic and therefore very similar across unrelated SLs, Entity CL tend to be more arbitrary and may therefore differ from SL to SL. This is illustrated by the pictures in (23) which show the vehicle CLs used in NGT, ASL, and Jordanian SL (LIU).



Classifier morphemes that fulfill similar functions are also found in some spoken languages. Compare the examples in (22) to the Cherokee examples in (24) (Aikhenvald 2000:161). Just

like the handshape morphemes in (22), the CL prefixes in (24) specify physical properties of the object that is being given.

- (24) a. Àma gà-**nèh**-néé'a
 water 3.SG.S/3.SG.O-**CL(liquid)**-give
 'She is giving him water.'
- b. Àhnàwo gà-**nvv**-nèè'a
 shirt 3.SG.S/3.SG.O-**CL(flexible)**-give
 'She is giving him a shirt.'

It should be noted, however, that the status of SL classifiers is debated (Cogill-Koez 2000; Liddell 2003; Schembri 2003). Also note that not all SLs make use of classifier handshapes to the same extent. Adamorobe SL, for instance, appears to employ no entity CL and only very few handle CL (Nyst 2007).

6 Sign language syntax

In (4), I have already pointed out that SLs differ from each other with respect to basic word order. In this domain, differences are found not only at the clause level (SOV vs. SVO) but also within the noun phrase (determiners and modifiers following or preceding the head noun).

It is important to note that linguistic information in SLs is not only conveyed manually (by the hands) but also non-manually (by facial expressions, head and body movements). Such non-manuals can be part of the lexical description of a sign (e.g. a spoken component or a mouth gesture), they can have a morphological function (as in (14c)), or a syntactic function. In this section, the focus will be on the last type of grammatical non-manual markers.

Syntactic non-manual markers accompany, for instance, negated utterances (Pfau 2002; Pfau & Quer 2007; Zeshan 2004a), questions (Neidle et al. 2000; Zeshan 2004b), topics (Aarons 1996), relative clauses (Liddell 1978; Pfau & Steinbach 2005), and conditionals (Dachkovsky 2008). For the most part, these markers are obligatory.

Sentences can differ minimally from each other in non-manual marking. Consider, for instance, the DGS examples in (25). The manual part, that is, the signs used and their order, is exactly the same in all three examples. In the declarative sentence in (25a), no specific non-manual marker finds use. In its negated counterpart (25b), however, part of the sentence (the verb phrase) is accompanied by a side-to-side headshake (hs). Finally, in the yes/no-question in (25c), all signs are accompanied by raised eyebrows (re).

Lillo-Martin 1997). I will not go into the technicalities of the different proposals but refer the reader to the summary of arguments provided in Sandler & Lillo-Martin (2006).

The size of wh-sign paradigms is also subject to variation. While most SLs have a full paradigm of wh-signs (WHAT, WHO, WHY, WHEN, WHERE, etc.), IPSL has a minimal paradigm consisting of only the general wh-sign G-WH (illustrated in (27b) above). This sign always appears sentence-finally and it cannot be doubled (29). The interpretation of this sign is highly context-dependent; depending on the context, example (29d) might, for instance, also be translated as “Why does your friend sleep?” or “When does your friend sleep?” (Aboh, Pfau & Zeshan 2005:24f).

- (29) a. $\frac{\text{wh}}{\text{CHILD ANGRY G-WH}}$
‘Why is the child angry?’
- b. $\frac{\text{wh}}{\text{INDEX}_2 \text{ AGE G-WH}}$
‘What’s your age?’
- c. $\frac{\text{wh}}{\text{INDEX}_3 \text{ COME G-WH}}$
‘Who is coming?’
- d. $\frac{\text{wh}}{\text{INDEX}_2 \text{ FRIEND SLEEP G-WH}}$
‘Where does your friend sleep?’

The above discussion makes clear that non-manual markers form an integral part of the syntactic component of SLs and that language-specific rules play an important role within that component. For the sake of completeness, I wish to point out that it has been shown that non-manuals also fulfill important pragmatic functions (for example, use of body leans; see Wilbur & Patschke (1999) for ASL and Kooij et al. (2006) for NGT).

In conclusion of this section, let me add a few words about the combination of different non-manual markers. The NGT example in (30a) illustrates that non-manual markers can combine sequentially. In this example, the topicalized constituent BOOK (marked by raised eyebrows) precedes a wh-question. There is a clear prosodic break between the two constituents: the sign BOOK is held longer than usual and frequently, this pause is accompanied by an eye blink. Note that the wh-question contains a sentence-final question particle.

- (30) a. $\frac{\text{top}}{\text{BOOK, STEAL WHO Q-PART}}$ $\frac{\text{wh}}{\text{Q-PART}}$
‘As for the book, who stole it?’
- b. $\frac{\text{re}}{\text{YESTERDAY PARTY YOUR FRIEND BE-PRESENT}}$ $\frac{\text{hs}}{\text{BE-PRESENT}}$ $\frac{\text{/shhh/}}{\text{Q-PART}}$
‘Was your friend not present at the party yesterday?’

Moreover, different non-manual markers can be combined simultaneously, that is, they can be layered (Wilbur 2000). In (30b), for instance, a lexical marker (the mouth gesture accompanying the sign BE-PRESENT) simultaneously combines with two syntactic markers,

one signaling negation (headshake) and one marking the utterance as a yes/no-question (eyebrow raise). It has been argued that many of the non-manual markers fulfill a prosodic function, that is, they behave like intonational contours in spoken language (Sandler 1999). In particular, they may define prosodic constituents such as prosodic words and intonational phrases.

7 Conclusion

SLs are more than just “handwaving and headshaking”. Quite to the contrary, they display complex grammatical structures at all linguistic levels. Above, I have discussed selected aspects concerning phonological, morphological, and syntactic structure. Comparative studies in the young research field of SL typology have demonstrated that SLs differ from each other at all levels of linguistic description (Zeshan 2006; Perniss et al. 2007), with differences generally being more significant at the level of syntax than at the levels of phonology and morphology. Moreover, cross-modal comparisons of spoken and sign languages have shown that (at least some) typological classifications and generalizations hold across modalities. Other generalizations and proposed language universals may have to be reconsidered in the light of SL data.

Still, because of (i) the potential to express concepts iconically and (ii) the use of signing space for various grammatical purposes, SLs appear to be more similar to each other than spoken languages. Meier (2002b) discusses this interesting cross-modal difference and refers to it as the “variation hypothesis”. Recent research has shown that not all SLs display the inflectional distinctions discussed in Section 5 (e.g. agreement and classification). However, those SLs which do exhibit these types of morphosyntactic alterations, all realize them in a strikingly similar way. For instance, in all SLs that mark agreement on verbs, agreement is phonologically realized by means of spatial modulations of the verb sign. It is expected that more in-depth research on grammatical aspects of different SLs – including urban and village SLs that have not been studied to date – will help us in uncovering which aspects of SL grammar are modality-specific and which are modality-independent.

References

- Aarons, Debra (1996). Topics and topicalization in ASL. *Stellenbosch Papers in Linguistics* 30, 65-106.
- Aboh, Enoch O., Roland Pfau & Ulrike Zeshan (2005). When a wh-word is not a wh-word: The case of Indian Sign Language. In: Bhattacharya, T. (ed.), *The Yearbook of South Asian languages and linguistics 2005*. Berlin: Mouton de Gruyter, 11-43.
- Aikhenvald, Alexandra Y. (2000). *Classifiers. A typology of noun categorization devices*. Oxford: Oxford University Press.

- Aronoff, Mark, Irit Meir & Wendy Sandler (2005). The paradox of sign language morphology. *Language* 81, 301-344.
- Battison, Robbin (1978). *Lexical borrowing in American Sign Language*. Burtonsville, MD: Linstok Press.
- Benedicto, Elena & Diane Brentari (2004). Where did all the arguments go?: Argument-changing properties of classifiers in ASL. *Natural Language & Linguistic Theory* 22, 743-810.
- Brentari, Diane (1998). *A prosodic model of sign language phonology*. Cambridge, MA: The MIT Press.
- Brown, Roger & David McNeill (1966). The 'tip of the tongue' phenomenon. *Journal of Verbal Learning and Verbal Behavior* 5, 325-337.
- Cogill-Koez, Dorothea (2000). Signed language classifier predicates: Linguistic structures or schematic visual representations? *Sign Language & Linguistics* 3 (2), 153-207.
- Conlin, Kimberly E., Gene R. Mirus, Claude Mauk & Richard P. Meier (2000). The acquisition of first signs: Place, handshape, and movement. In: Chamberlain, C., J.P. Morford & R.I. Mayberry (eds.), *Language acquisition by eye*. Mahwah, NJ: Lawrence Erlbaum, 51-69.
- Crasborn, Onno (2006). A linguistic analysis of the use of the two hands in sign language poetry. In: Weijer, J. van de & B. Los (eds.), *Linguistics in the Netherlands 2006*. Amsterdam: Benjamins, 65-77.
- Dachkovsky, Svetlana (2008). Facial expression as intonation in Israeli Sign Language: the case of neutral and counterfactual conditionals. In: J. Quer (ed.), *Signs of the time. Selected papers from TISLR 2004*. Hamburg: Signum, 61-82.
- Frishberg, Nancy (1975). Arbitrariness and iconicity: Historical change in American Sign Language. *Language* 51, 696-719.
- Geraci, Carlo (2005). Negation in LIS (Italian Sign Language). In: Bateman, L. & C. Ussery (eds.), *Proceedings of the North East Linguistic Society (NELS 35)*. Amherst, MA: GLSA.
- Glück, Susanne & Roland Pfau (1997). *Eine Klasse für sich: Klassifizierende Verben in Deutscher Gebärdensprache*. *Zeitschrift für Sprachwissenschaft* 16 (1/2), 181-208.
- Goldin-Meadow, Susan (1999). The development of gesture with and without speech in hearing and deaf children. In: Messing, L.S. & R. Campbell (eds.), *Gesture, speech, and sign*. Oxford: Oxford University Press, 117-132.
- Hendriks, Bernadet (2008). *Jordanian Sign Language: Aspects of grammar from a cross-linguistic perspective*. PhD dissertation, University of Amsterdam.
- Hohenberger, Annette, Daniela Happ & Helen Leuninger (2002). Modality-dependent aspects of sign language production: Evidence from slips of the hands and their repairs in German Sign Language. In: Meier, R.P., K.A. Cormier & D.G. Quinto-Pozos (eds.), *Modality and structure in signed and spoken languages*. Cambridge: Cambridge University Press, 112-142.
- Hulst, Harry van der (1996). On the other hand. *Lingua* 98, 121-143.
- Janis, Wynne D. (1995). A crosslinguistic perspective on ASL verb agreement. In: Emmorey, K. & J. Reilly (eds.), *Language, gesture, and space*. Hillsdale, NJ: Erlbaum, 195-223.
- Johnston, Trevor (2003). BSL, Auslan and NZSL: three signed languages or one? In: Baker, A., B. van den Bogaerde & O. Crasborn (eds.), *Cross-linguistic perspectives in sign language research. Selected papers from TISLR 2000*. Hamburg: Signum, 47-69.
- Johnston, Trevor, Myriam Vermeerbergen, Adam Schembri & Lorraine Leeson (2007). 'Real data are messy': Considering cross-linguistic analysis of constituent ordering in Auslan, VGT, and ISL. In: Perniss, P., R. Pfau & M. Steinbach (eds.), *Visible variation: Cross-linguistic studies on sign language structure*. Berlin: Mouton de Gruyter, 163-205.
- Kegl, Judy, Ann Senghas & Marie Coppola (1999). Creation through contact: sign language emergence and sign language change in Nicaragua. In: DeGraff, M. (ed.), *Language creation and language change: creolization, diachrony, and development*. Cambridge, MA: MIT Press, 179-237.
- Kisch, Shifra (2004). Negotiating (genetic) deafness in a Bedouin community. In: Cleve, J.V. Van (ed.), *Genetics, disability, and deafness*. Washington, DC: Gallaudet University Press, 148-173.
- Klima, Edward & Ursula Bellugi (1979). *The signs of language*. Cambridge, MA: Harvard University Press.
- Kooij, Els van der, Onno Crasborn & Wim Emmerik (2006). Explaining prosodic body leans in Sign Language of the Netherlands: Pragmatics required. *Journal of Pragmatics* 38, 1598-1614.
- Ladd, Paddy (2003). *Understanding Deaf culture. In search of Deafhood*. Clevedon: Multilingual Matters Ltd.
- Lane, Harlan (2002). Do deaf people have a disability? *Sign Language Studies* 2 (4), 356-379.

- Liddell, Scott K. (1978). Nonmanual signals and relative clauses in American Sign Language. In: Siple, P. (ed.), *Understanding language through sign language research*. New York: Academic Press, 59-90.
- Liddell, Scott K. (2003). Sources of meaning in ASL classifier predicates. In: Emmorey, K. (ed.), *Perspectives on classifier constructions in sign languages*. Mahwah, NJ: Lawrence Erlbaum, 199-220.
- Marsaja, Gede (2008). *Desa Kolok – A deaf village and its sign language in Bali, Indonesia*. Nijmegen: Ishara Press.
- Mathur, Gaurav (2000). *Verb agreement as alignment in signed languages*. PhD. thesis, MIT [MIT Working Papers in Linguistics].
- McBurney, Susan (2002). Pronominal reference in signed and spoken language: Are grammatical categories modality-dependent? In: Meier, R.P., K.A. Cormier & D.G. Quinto-Pozos (eds.), *Modality and structure in signed and spoken languages*. Cambridge: Cambridge University Press, 329-369.
- Meier, Richard P. (2002a). The acquisition of verb agreement: Pointing out arguments for the linguistic status of agreement in signed languages. In: Morgan, G. & B. Woll (eds.), *Directions in sign language acquisition*. Amsterdam: Benjamins, 115-141.
- Meier, Richard P. (2002b). Why different, why the same? Explaining effects and non-effects of modality upon linguistic structure in sign and speech. In: Meier, R.P., K.A. Cormier & D.G. Quinto-Pozos (eds.), *Modality and structure in signed and spoken languages*. Cambridge: Cambridge University Press, 1-25.
- Meir, Irit (2002). A cross-modality perspective on verb agreement. *Natural Language & Linguistic Theory* 20, 413-450.
- Morford, Jill P. (1996). Insights to language from the study of gesture: a review of research on the gestural communication of non-signing deaf people. *Language and Communication* 16, 165-178.
- Morgan, Gary & Bencie Woll (eds.) (2002). *Directions in sign language acquisition*. Amsterdam: Benjamins.
- Nakanishi, Kikuji (1994). The influence of Japanese word order on Japanese Sign Language. In: Brennan, M. & G.H. Turner (eds.), *Word-order issues in sign language*. Durham: ISLA, 171-192.
- Neidle, Carol, Judy Kegl, Dawn MacLaughlin, Ben Bahan & Robert G. Lee (2000). *The syntax of American Sign Language. Functional categories and hierarchical structure*. Cambridge, MA: MIT Press.
- Newkirk, Don, Edward S. Klima, Carlene C. Pedersen & Ursula Bellugi (1980). Linguistic evidence from slips of the hand. In: Fromkin, V.A. (ed.), *Errors in linguistic performance: Slips of the tongue, ear, pen and hand*. New York: Academic, 165-197.
- Newport, Elissa L. & Richard P. Meier (1985). The acquisition of American Sign Language. In Slobin, D.I. (ed.), *The cross-linguistic study of language acquisition, Vol. 1*. Hillsdale: Erlbaum, 881-938.
- Nederlands Gebarententrum (2002). CDRom *Basisgrammatica Nederlandse Gebarentaal*. Nederlands Gebarententrum & Universiteit van Amsterdam: Bunnik & Amsterdam.
- Nyst, Victoria (2007). *A descriptive analysis of Adamorobe Sign Language (Ghana)*. Ph.D. dissertation, University of Amsterdam.
- Padden, Carol & Tom Humphries (1988). *Deaf in America. Voices from a culture*. Cambridge, MA: Harvard University Press.
- Padden, Carol & Tom Humphries (2005). *Inside Deaf culture*. Cambridge, MA: Harvard University Press.
- Perniss, Pamela, Roland Pfau & Markus Steinbach (2007). Can't you see the difference? Sources of variation in sign language structure. In: Perniss, P., R. Pfau & M. Steinbach (eds.), *Visible variation: Cross-linguistic studies on sign language structure*. Berlin: Mouton de Gruyter, 1-34.
- Petronio, Karen & Diane Lillo-Martin (1997). WH-movement and the position of Spec-CP: Evidence from American Sign Language. *Language* 73 (1), 18-57.
- Pfau, Roland (2002). Applying morphosyntactic and phonological readjustment rules in natural language negation. In: Meier, R.P., K.A. Cormier & D.G. Quinto-Pozos (eds.), *Modality and structure in signed and spoken languages*. Cambridge: Cambridge University Press, 263-295.
- Pfau, Roland (2008a). The grammar of headshake: A typological perspective on German Sign Language negation. *Linguistics in Amsterdam* 2008 (1), 34-71.
- Pfau, Roland (2008b). Woordvorming. In: Baker, A., B. van den Bogaerde, R. Pfau & T. Schermer (eds.), *Gebarentaalwetenschap – een inleiding*. Deventer: Van Tricht, 168-193.
- Pfau, Roland & Josep Quer (2007). On the syntax of negation and modals in Catalan Sign Language and German Sign Language. In: Perniss, P., R. Pfau & M. Steinbach (eds.), *Visible variation: Cross-linguistic studies on sign language structure*. Berlin: Mouton de Gruyter, 129-161.

- Pfau, Roland & Markus Steinbach (2003). Optimal reciprocals in German Sign Language. *Sign Language & Linguistics* 6 (1), 3-42.
- Pfau, Roland & Markus Steinbach (2005). Relative clauses in German Sign Language: Extraposition and reconstruction. In: Bateman, L. & C. Ussery (eds.), *Proceedings of the North East Linguistic Society (NELS 35)*, Vol. 2. Amherst, MA: GLSA, 507-521.
- Pfau, Roland & Markus Steinbach (2006a). Modality-independent and modality-specific aspects of grammaticalization in sign languages. *Linguistics in Potsdam* 24, 3-98. Available at <http://www.ling.uni-potsdam.de/lip/>.
- Pfau, Roland & Markus Steinbach (2006b). Pluralization in sign and in speech: A cross-modal typological study. *Linguistic Typology* 10, 135-182.
- Rathmann, Christian (2005). *Event structure in American Sign Language*. Ph.D. dissertation, University of Texas at Austin.
- Sandler, Wendy (1989). *Phonological representation of the sign. Linearity and nonlinearity in American Sign Language*. Dordrecht: Foris.
- Sandler, Wendy (1999). The medium and the message: Prosodic interpretation of linguistic content in Israeli Sign Language. *Sign Language & Linguistics* 2 (2), 187-215.
- Sandler, Wendy & Diane Lillo-Martin (2006). *Sign languages and linguistic universals*. Cambridge: Cambridge University Press.
- Sandler, Wendy, Irit Meir, Carol Padden & Mark Aronoff (2005). The emergence of grammar: systematic structure in a new language. *Proceedings of the National Academy of Sciences* 102 (7), 2661-2665.
- Schembri, Adam (2003). Rethinking 'classifiers' in signed languages. In: Emmorey, K. (ed.), *Perspectives on classifier constructions in sign languages*. Mahwah, NJ: Lawrence Erlbaum, 3-34.
- Siedlecki, Theodore & John D. Bonvillian (1993). Location, handshape & movement: Young children's acquisition of the formational aspects of American Sign Language. *Sign Language Studies* 78, 31-52.
- Steinbach, Markus & Roland Pfau (2007). Grammaticalization of auxiliaries in sign languages. In: Perniss, P., R. Pfau & M. Steinbach (eds.), *Visible variation: Cross-linguistic studies on sign language structure*. Berlin: Mouton de Gruyter, 303-339.
- Stokoe, William C. (1960). Sign language structure: An outline of the communication systems of the American Deaf. *Studies in Linguistics, Occasional Papers* 8. University of Buffalo [Re-issued 1978, Linstok Press, Silver Spring, MD].
- Supalla, Ted (1986). The classifier system in American Sign Language. In: Craig, C. (ed.), *Noun classes and categorization*. Amsterdam: Benjamins, 181-214.
- Sutton-Spence, Rachel (2005). *Analysing sign language poetry*. Houndmills: Palgrave Macmillan.
- Sutton-Spence, Rachel & Michiko Kaneko (2007). Symmetry in sign language poetry. *Sign Language Studies* 7 (3), 284-318.
- Tang, Gladys (2006). Questions and negation in Hong Kong Sign Language. In: Zeshan, U. (ed.), *Interrogative and negative constructions in sign languages*. Nijmegen: Ishara Press, 198-224.
- Thompson, Robin, Karen Emmorey & Tamar H. Gollan (2005). "Tip of the fingers" experiences by deaf signers. *Psychological Science* 16 (11), 856-860.
- Wilbur, Ronnie B. (2000). Phonological and prosodic layering of nonmanuals in American Sign Language. In: Emmorey, K. & H. Lane (eds.), *The signs of language revisited*. Mahwah, NJ: Erlbaum, 213-244.
- Wilbur, Ronnie B. & Cynthia G. Patschke (1998). Body leans and the marking of contrast in American Sign Language. *Journal of Pragmatics* 30, 275-303.
- Woll, Bencie & Paddy Ladd (2003). Deaf communities. In: Marschark, M. & P.E. Spencer (eds.), *Oxford handbook of deaf studies, language, and education*. Oxford: Oxford University Press, 151-163.
- Zeshan, Ulrike (2004a). Hand, head, and face: Negative constructions in sign languages. *Linguistic Typology* 8, 1-58.
- Zeshan, Ulrike (2004b). Interrogative constructions in signed languages: Cross-linguistic perspectives. *Language* 80 (1), 7-39.
- Zeshan, Ulrike (2006). Negative and interrogative constructions in sign languages: A case study in sign language typology. In: Zeshan, U. (ed.), *Interrogative and negative constructions in sign languages*. Nijmegen: Ishara Press, 28-68.
- Zwitsersloot, Inge (2003). *Classifying hand configurations in Nederlandse Gebarentaal*. Utrecht: LOT

Zwitserslood, Inge & Ingeborg van Gijn (2006). Agreement phenomena in Sign Language of the Netherlands. In: Ackema, P. et al. (eds.), *Arguments and agreement*. Oxford: Oxford University Press, 195-229.