Handwaving and headshaking?
On the linguistic structure of sign languages

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1.   Introduction

Watching a group of signers in communication with each other, the naive 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 (1*a*), 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 (1*b*), 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 (1*a*). 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]

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

(1)   *a.*

GERMANY   GERMANY
(NGT)   (ASL)

        b.

ANSWER   ANSWER
(NGT)   (ASL)

The examples in (1*b*) 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 onomatopoetics (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 (2*a*), Danish SL (2*b*), and Chinese SL (2*c*) (Klima & Bellugi, 1979, p. 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)

a. TREE   *b.* TREE   *c.* TREE
(American SL)   (Danish SL)   (Chinese SL)

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 (3*a*) while Turkish is underlyingly SOV (3*b*) (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 (*Deutsche Gebärdensprache*: DGS) 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 |

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').

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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.

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 (⌐-hand vs. ⌐-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 ⌐-hand to ⌐-hand) and the movement (straight sideward movement) parameter.

(6) a.

GERMANY   TURKEY
(NGT)   (NGT)

     b.

SUMMER   DRY
(ASL)   (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 hand-shape, 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). Simi-larly, features and feature combinations have been suggested for the parameters movement and location.

(7)   *a.*   ⟨⟩ :   [all], [open]   *b.*   ⟨⟩ :   [one], [open]
        c.   ⟨⟩ :   [all], [closed], [opposed]   *d.*   ⟨⟩ :   [radial], [ulnar], [open]

Based on criteria such as frequency, ease of articulation, and order of acquisition, unmarked handshapes (e. g., ⟨⟩, ⟨⟩, ⟨⟩) can be distinguished from marked handshapes (e. g., ⟨⟩, ⟨⟩, ⟨⟩). Unmarked handshapes are more frequent within and across SLs and they are acquired earlier by children.
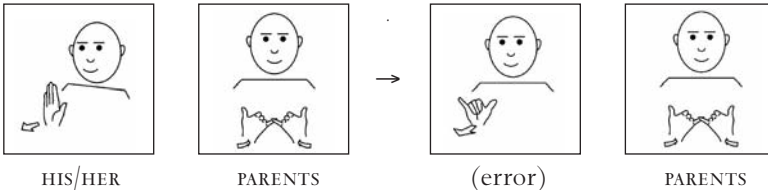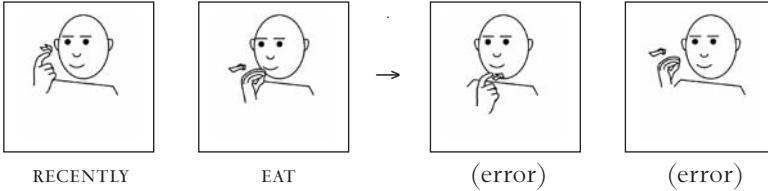
Another important phonological distinction is the distinction between one-handed and two-handed signs—see, for instance, the signs in (1)—. Just as in spoken languages, phonological elements cannot be randomly combined (e. g., *mkono* is not a possible word in English, but it is in Swahili). Particularly 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 (8*a*). This restriction is clearly phonological and not physical in nature. From an articulatory p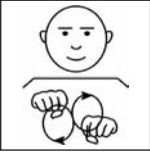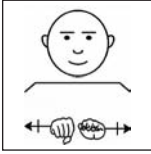oint of view, the impossible sign in (8*a*) does not pose any prob-lems. Still, the symmetry condition seems to constrain the form of two-handed signs in all SLs studied to date.

(8)   *a.*   *b.*

BIKE   impossible sign   TEA   PAY

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 (8*b*).

Psycholinguistic evidence for the existence of phonological units comes from spontaneous speech errors. In the DGS slip of the hand in (9*a*), a phonological unit, namely the ⍟-handshape, is anticipated (Hohenberger *et al.*, 2002, p. 119). Compare the English slip of the tongue in (10*a*), a consonant anticipation. In both cases, the result is a non-existing but possible sign/word. The ASL slip of the hand in (9*b*) 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, p. 175). An example of an English consonant exchange is given in (10*b*).

(9) *a.*

HIS/HER   PARENTS   (error)   PARENTS

b.

RECENTLY   EAT   (error)   (error)

(10) *a.* some funny kind   →   some **k**unny kind
      b. a pitch fork   →   a **f**itch **p**ork

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 hand-shape 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 (Sut-

ton-Spence & Kaneko, 2007), and flowing movements. In addition, poetic effect may be achieved by neologisms (11*a*) and the use of lexical ambiguities (11*b*) (Sutton-Spence, 2005). The sign in (11*a*) 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 ⵁ-handshape in (11*b*) 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).

(11) *a.*   *b.*

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, p. 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.
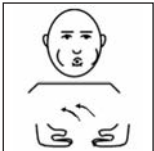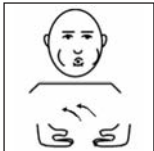
(12)   right hand: PISTOL-AT-HEAD   PISTOL-SHOOT   FALL-DOWN
       left hand: HOPE -----------   DO -----------   LIFE --------

       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 (13*a*).

(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 (14*a*), the citation form of the verb GIVE is shown. The morphologically complex forms in (14*bc*) 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 (14*b*). 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 (14*c*) (Pfau, 2008*b*, p. 169).

(14)   *a.*   *b.*   *c.*

        GIVE   GIVE-CL $_2$GIVE$_1$-CL
   (citation form)   (e. g. a book)   (e. g. you give me a heavy book)

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).

(15)   *a.*

| CHILD | CHILDREN |

b.

| BOOK | BOOKS |
| | 3× |
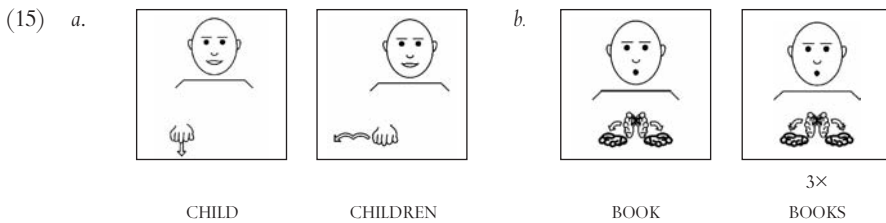
Interestingly, reduplication is used for exactly the same purposes in many spoken languages, that is, for iterative aspect, as in the Tzeltal (Mexico) examples in (16a), and for plurality, as in the Warlpiri (Australia) examples in (16b). Generally, in both modalities, the uses of reduplication as a 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 $\mathcal{A}$-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 (17*b*).

(17)
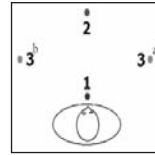
a. Signing space   *b.* Localization of referents

In contrast, for non-present referents, an arbitrary locus must be introduced. This localization strategy is illustrated by the DGS example in (18*a*). In this utterance, the signer talks about two non-present male referents. The referent MAN is localized at location 3*a* while the referent FRIEND is linked to location 3*b*. Subsequently, these loci can be used for pronominal reference, as shown in (18*b*), where INDEX₃ₐ refers back to FRIEND by targeting the location previously associated with this referent. In contrast to, for instance, English (18*c*), the reference (i. e. the interpretation) of the pronoun is always unambiguous.

(18)   *a.*   YESTERDAY MAN INDEX₃ₐ FRIEND INDEX₃ᵦ ₃ₐVISIT₃ᵦ
             'Yesterday the man visited his friend …'
       b.   REASON **INDEX₃ᵦ** SAD
             '… because he (the friend) is sad.'
       c.   A manᵢ visits his friendⱼ 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 (19*a*) and/or orientation (19*b*) 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 (20*a*) and (20*b*), respectively. For GIVE, the beginning and end location are given (Nederlands Gebarencentrum, 2002).

(19) Sign Language of the Netherlands

    a. Agreement verb (path movement): $_1$GIVE$_2$ / $_2$GIVE$_1$ / $_1$GIVE$_3$ / $_2$GIVE$_3$ …
          'I give to you / You give to me / I give to him/her / S/he gives to you.'

    b. Agreement verb (finger orientation): $_1$CALL$_2$ / $_2$CALL$_1$ / $_1$CALL$_3$ / $_3$CALL$_2$ …
          'I call you / You call me / I call him/her / S/he calls you.'

(20) *a.*

$_2$GIVE$_1$
('you give to me')

GIVE$_3$
$_2$('you give to him/her')

    b.

$_2$CALL$_1$
('you call me')

$_3$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 SLs, 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 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 🖐-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 (🖐)
              '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 $_3$GIVE$_1$ (✊)
              'A woman gives me a flower.'
       b.   WOMAN CUP $_3$GIVE$_1$ (✋)
              '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).

(23)

DGS   ASL   LIU
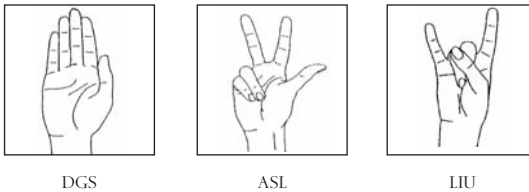
Classifier morphemes that fulfill similar functions are also found in some spoken languages. Compare the examples in (22) to the Cherokee examples in (24) (Aikhenvald, 2000, p. 161). Just like the handshape morphemes in (22), the CL prefixes in (24) specify physical properties of the object that is being given.

(24)   *a.* Àma   gà-**nèèh**-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 (14*c*), or a syntactic function (Pfau & Quer, in press). 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, 2004*a*), questions (Neidle *et al.*, 2000; Zeshan, 2004*b*), 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 (25*a*), no specific non-manual marker finds use. In its negated counterpart (25*b*), however, part of the sentence (the verb phrase) is accompanied by a side-to-side headshake (hs). Finally, in the yes/no-question in (25*c*), all signs are accompanied by raised eyebrows (re).

(25)   *a.*   MAN INDEX$_{3a}$ BOOK BUY
           'The man buys a book.'
                             __hs__
   b.   MAN INDEX$_{3a}$ BOOK BUY
           'The man doesn't buy a book.'
                             __re__
   c.   MAN INDEX$_{3a}$ BOOK BUY
           'Does the man buy a book?'

Looking at the negated example (25*b*), we see that DGS is a non-manual dominant SL (Zeshan, 2006). DGS does have a negative particle NICHT ('not'), which usually appears in sentence-final position. The use of this particle, however, is optional.

Obviously, the headshake alone is sufficient to negate a clause (Pfau, 2008*a*). Other SLs that behave like DGS in this respect are ASL, NGT, BSL, and Indo-Pakistani SL (IPSL).

In contrast, negation in other SLs shows a manual-dominant pattern. In LIU, Italian SL (LIS), and Hong Kong SL (HKSL), for example, the use of a negative particle is obligatory. Consequently, the HKSL example in (26*a*) and the LIS example in (26*b*) are ungrammatical (Tang, 2006; Geraci, 2005). Generally, in manual-dominant SLs, negation cannot be expressed by a non-manual marker only and moreover, the non-manual usually extends only over the manual negation sign, that is, it cannot spread over the verb or the verb phrase. This pattern is illustrated by the LIS example in (26*c*).

<div style="margin-left:2em;">

                                    <u>   hs </u>

(26)   *a*. * YESTERDAY NIGHT FATHER   FAX FRIEND
            'Father didn't fax his friend last night.'
            <u>(((hs)</u>
    b. * PAOLO CONTRACT SIGN
          'Paolo didn't sign the contract.'
                         <u> hs </u>
    c.   PAOLO CONTRACT SIGN NOT
          'Paolo didn't sign the contract.'

</div>

In the area of syntactic non-manual marking, further typological variation is attested with respect to the form of non-manual markers for a specific syntactic function. Interestingly, these markers may differ from SL to SL. Across SLs, wh-questions are also marked non-manually. In Israeli SL (just as in ASL and NGT), an important component of wh-marking are lowered eyebrows (27*a*) while in IPSL, the eyebrows are raised and the head is tilted slightly backwards (27*b*). In LIU and other SLs of the Eastern Mediterranean, a backwards head tilt is observed in negative contexts (27*c*) (Hendriks, 2008). Clearly, this marker is culture-specific. It is borrowed from the hearing community where a similar gesture is commonly used in negative contexts (see Pfau & Steinbach, 2006*a*, for the grammaticalization of gestures in SLs). In addition, however, LIU also makes use of the negative headshake.

(27)

a. wh-marking in Israeli SL	*b*. wh-marking in Indo-Pakistani SL	*c*. backward head tilt in Jordanian SL

Wh-questions in SLs have raised considerable interest because they exhibit properties that are intriguing from a cross-linguistic perspective. It has been found that, in striking contrast to spoken languages, most SLs allow for sentence-final placement of wh-signs (Zeshan, 2004*b*), as is illustrated in the ASL example in (28*a*) (Neidle *et al.*, 2000). Moreover, it is quite common for wh-signs to be doubled, that is, to occupy a sentence-initial *and* sentence-final position (28*b*). A comparable doubling strategy is not attested in spoken language wh-questions.

<div style="margin-left:2em">

                                wh
—————————————————————————

(28)   *a*.   BOOK BUY YESTERDAY WHO
             'Who bought a book yesterday?'

                                 wh
         —————————————————————————
   b.   WHO BOOK BUY YESTERDAY WHO
             'Who bought a book yesterday?'

</div>

Clearly, the wh-subject in (28*a*) does not occupy the sentence-initial position in which the subject would appear in a declarative clause (remember that ASL has SVO-order). With respect to wh-question formation, most scholars working in the generative tradition assume that two types of languages have to be distinguished. In wh-in-situ languages (e. g., Japanese) the wh-word occupies the same position that the argument that is being asked for would occupy in a declarative clause. In contrast, in wh-movement languages (e. g., English), the wh-sign is moved from its base position. Based on a wealth of typological data, the following strong generalization has been proposed: in wh-movement languages, wh-movement always proceeds to the left. Clearly, data from ASL and other SLs are a challenge for this linguistic universal. Based on SL data, some researchers assume that the proposed universal is too

strong and that rightward movement exists (Neidle *et al.*, 2000) while others claim that the SL data can be accounted for within a model that endorses leftward movement only (Petronio & 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 (27*b*) 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 (29*d*) might, for instance, also be translated as "Why does your friend sleep?" or "When does your friend sleep?" (Aboh, Pfau & Zeshan, 2005, p. 24*f*).

(29) *a.* $\overline{\qquad\qquad\text{wh}}$
       CHILD ANGRY **G–WH**
       'Why is the child angry?'

      b. $\overline{\qquad\qquad\text{wh}}$
       INDEX₂ AGE **G–WH**
       'What's your age?'

      c. $\overline{\qquad\qquad\text{wh}}$
       INDEX₃ COME **G–WH**
       'Who is coming?'

      d. $\overline{\qquad\qquad\qquad\text{wh}}$
       INDEX₂ 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 (30*a*) 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.* $\overline{\quad\text{top}\quad}$ $\overline{\qquad\qquad\text{wh}}$
       BOOK,   STEAL WHO Q-PART
       'As for the book, who stole it?'

```
                                                          re
                                      _____    hs
                                          ____          /shhh/
```
   b.   YESTERDAY PARTY   YOUR FRIEND   BE-PRESENT
          '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 (30*b*), 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 (2002*b*) 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 spa-

tial 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.

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