Part 4: **Morphology**

Chapter 0 Preliminary considerations

This introduction is meant as a guide to morphological structure, which is the word formation component of grammar. Our purpose is to introduce the relevant terms that will be used throughout this chapter, and to give a general introduction to the field of morphology.

0.1 What is morphology?

The term "morphology" is used in many different ways in the literature; it may refer to the internal structure of words, the subcomponent of linguistics that studies the structure of words, the component in which words are created, or to affixes and the features associated with affixes. We use the term in the first sense, that is, to refer to the internal structure of words (also known as "the morphological structure of words").

Although the term 'word' is central to morphology, we use it in an informal sense and not as a technical term. Firstly, the difficulty of describing 'word' is widely recognized, as there are different types of words (orthographic word, prosodic word [Phonology – Section 2.2.1] / prosodic word, grammatical word); nevertheless, there is an intuitive sense in which 'word' can be used. For instance, we can say that the sentence *John loves eating apples* is made up of four words. Just as sentences are made up of such smaller parts, words too are made up of parts. For example, the word *books* is made up of two parts ('book-s'), a root and an affix, and the word *kingdoms* is made up of three parts ('king-dom-s'), a root and two affixes.

It is useful to know that morphology is based on the systematic correspondence of form and function. These two are separate concepts. Taking the example *books*, the element '-s' has a particular form (*s*), which indicates (encodes) the function of plurality. It is written as *s*, and pronounced as [s]. However, plurality can be expressed in different ways in English, some due to phonological reasons (*bears* [z], *peaches* [əz], others for lexical reasons (e.g. *oxen* [ən], *sheep* – no overt form). Since all of these indicate the same function, i.e. plurality, they comprise a single morpheme, the smallest unit that has a meaning (here, plurality). This particular morpheme is a set that contains the forms [s], [z], [əz], [ən], and Ø (no overt form) – a set of five allomorphs. The forms *book*, *bear*, *peach*, etc. are also morphemes, as they cannot be further broken down into meaningful parts.

Besides the notions already introduced, other notions referring to the building blocks of words that figure prominently in the area of morphology, and that will be used in the following, are lexeme, stem, and clitic.

DOI 10.1515/9781501511806-009,

0.2 Organization of the Morphology Part

This part adopts the widely accepted distinction of three types of word formation: compounding, derivation, and inflection. These word formation strategies are very common across languages, and differ from each other with respect to what types of elements (see previous section [Morphology – Section 0.1]) are combined. The basic properties of these three types of word formation are summarized here for the grammar writer's convenience.

- *Compounding* [Morphology – Chapter 1]: Under compounding, two stems are combined to create a new word. Often the stems involved are free morphemes, but this is not always the case. Compounding is taken to be a type of word formation that takes place in the lexicon.
- *Derivation* [Morphology – Chapter 2]: Just like compounding, derivation is considered a type of lexical word formation; in contrast to compounding, however, derivation involves a single stem and (usually) some additional material smaller than a stem (e.g. an affix). A derivational affix can change the category of the stem (e.g. *sing* (verb) → *sing-er* (noun)). A derivational process may be semantically irregular (e.g. English *runner*, which may refer to a long carpet).
- *Inflection (verbal inflection* [Morphology – Chapter 3] – *nominal inflection* [Morphology – Chapter 4]*)*: Inflectional word formation is relevant to and dependent on syntax (it is therefore also referred to as "morphosyntax"); it comprises grammatical modifications like case, agreement, tense, and aspect, among others. Just like derivation, inflection usually involves the combination of a stem and an affix; yet, it can never change the category of the stem (e.g. *paint* (verb) → *paint-ed* (verb)). Inflection is semantically regular.

Moreover, in the final chapter of this part, we will address an additional type of word formation that is not easily subsumed under the three types listed above, but which also affects verbal stems: word formation involving classifiers [Morphology – Chapter 5] / classifiers.

0.3 How to use the Morphology Part

Since processes that have been characterized as derivational are not always easily distinguished from compounding on the one hand, and from inflection on the other hand, it may be advisable for the grammar writer to study the introductions to the chapters on compounding, derivation, and verbal inflection together, so as to get an idea of the challenges that come with the classification of morphological processes in sign languages.

It is also worth noting that a number of aspects that are addressed in this part of the Blueprint also make an appearance in other parts. This is not surprising, as

morphology has clear relations to other areas, most importantly, the lexicon and syntax. To give two illustrative examples: First, negation is discussed in two sections within this part, as it may be derivational and inflectional. However, negation is also a syntactic process, as, in the case of a free particle, the word order of the clause may be affected – it is therefore also addressed in the Syntax Part of the Blueprint. Moreover, negative particles that exist in a sign language will be listed in the Lexicon Part. Second, various morphosyntactic phenomena – most importantly, tense, aspect, modality, and agreement – may be realized on the verb as inflections, or by free grammatical markers (e.g. auxiliaries). The former are discussed in this part under Verbal inflection [Morphology – Chapter 3], the latter are addressed in the Lexicon Part under Lexical expressions of grammatical categories [Lexicon – Section 3.3].

Chapter 1 Compounding

1.0 Definitions and challenges

1.0.1 What is a compound?

Compounding is one of the most productive word formation processes and one that is widespread especially in new languages. Compounds are morphological constructions that are made up of two (and sometimes more) juxtaposed units and which syntactically and semantically behave like a single unit (word/lexical item). The fact that the morphemes that participate in compound formation are stems distinguishes compounding from affixation. These stems are often, but not always, freely occurring elements, and they may be complete or reduced. Specific to sign languages, fingerspelled [Lexicon – Section 2.2.2] / fingerspelled letters may combine with stems in compound formation. The components of a compound in sign languages are expressed by manual articulators. As further detailed below, the parts of a compound may each have a different categorial status and may interact in various ways to yield the complex meaning of the compound.

Identifying compounds in a spoken language is not always straightforward, as in the written form of a spoken language the parts that form the compound may be written as one word (e.g. German *Apfelkuchen*), as two words (e.g. English *apple pie*), or may be hyphenated (e.g. English *know-all*). Moreover, in identifying a particular form as a compound, it is also necessary to distinguish that form from:

(i) a word
(ii) a phrase
(iii) a blend and a clipping

(i) *Compounds versus words*:
Simultaneous compounds may be deceptively similar to words, due to the reduction in their form. Clear clues are the violation of the handshape change constraint [Phonology – Section 1.3.2] (Sandler 1989) and the symmetry condition [Phonology – Section 1.4] (Battison 1978). If these occur and the sign is a lexical item, then this is an indication of compounding.

(ii) *Compounds versus phrases*:
Some compounds share with phrases the property of having syntactic heads and non-heads (modifiers and complements). However, compounds and phrases are different on many counts: (i) modification of the parts is possible in phrases but not in compounds; (ii) separability of the constituents by other constituents is possible in phrases but not in compounds; (iii) obligatory genericity of the non-head of a compound; (iv) changes in the movement of both of the components in compounds; (v) unification of the handshapes in compounds; (vi) different stress patterns; and (vii) differences in rhythm (see Klima & Bellugi 1979).

(iii) *Compounds versus blends/clippings*:
Just like compounds, blends and clippings are also formed by the combination of more than one stem. The difference between compounds and blends/clippings in spoken languages is that the latter involve phonologically reduced stems. Blends, on the one hand, are cut from the inner edges of the juncture point between two stems (e.g. *smog* (*smoke*+*fog*) and *brunch* (*breakfast*+*lunch*)), and what remains as the output form is the phonological material at the outer edges of the two input stems. In clippings, on the other hand, the initial parts of two stems are retained while the rest is clipped (e.g. *sitcom* (*situation*+*comedy*) and *Interpol* (*international*+*police*)). In contrast to both, spoken language compounds contain the full form of both the stems.

There are various other differences between these construction types: (i) compounds can have heads, blends and clippings do not; (ii) compounds usually have a different stress pattern than words (compound stress), whereas blends have word stress; (iii) compounding is/can be productive, whereas blends and clippings are idiosyncratic (see Bat-El (2006) for details).

1.0.2 Types of compounds

In both spoken and sign languages, different types of compounds have to be distinguished, depending on the semantic and/or syntactic contribution of their parts. Some structural aspects of compounds are modality-independent while others are modality-specific. Here we only provide a brief overview of the relevant distinctions, as the various types will be discussed in more detail in subsequent sections.

A distinction that is central to the following discussion is the distinction between native compounds [Morphology – Section 1.1] and loan compounds [Morphology – Section 1.2]. The latter also include compounds involving fingerspelling, as fingerspelling by definition represents borrowing from a spoken language. While the distinction between native and loan compounds is in principle modality-independent, borrowing of structures from the surrounding spoken language appears to be very common across sign languages. The use of fingerspelling as a component of compounds is, of course, modality-specific.

Within both groups, sequential compounds have to be distinguished from simultaneous compounds. The former type is characterized by the sequential juxtaposition of two (or more) free morphemes. The existence of the latter type, i.e. the potential simultaneity of the components, is clearly a modality-specific property of sign language compounds, as only the visual modality allows for the simultaneous articulation of two stems, thanks to the availability of two manual articulators. Some constraints and issues relating to simultaneity are explored in the section on simultaneous and semi-simultaneous compounds [Morphology – Section 1.1.2].

A structural aspect of compounds that is modality-independent is headedness. For example, *apple pie* is a headed compound – an apple pie is a type of pie – whereas *know-all* is neither a type of *know*ing nor a type of *all*, which makes this compound headless. Typically, in headed compounds, one of the parts functions as a modifier or as a complement.

Another aspect is the syntactic category of the components of a compound. The fact that in compounds elements of different syntactic categories may be combined is also modality-independent. The input categories of compounds are usually nouns, adjectives, and verbs, and the output categories are nouns, adjectives, verbs, and adverbs. Across spoken languages, most compounds appear to be nouns, but obviously, the categorial status of input and output categories may vary from language to language.

1.0.3 Methodological challenges

When investigating compounds in a particular sign language, it is important to keep in mind that phonological properties – reduction and assimilation processes as well as the potential simultaneity – may make the identification of compounds difficult. We discuss these factors in more detail below, but it should be emphasized at the outset that, given these properties, what looks like a simplex sign may in fact have originated from a morphologically complex structure.

A famous example for this kind of diachronic change is the ASL sign for 'home', which, in fact, is usually glossed as such: HOME. Originally, however, the sign derives from the compound SLEEP^EAT. In isolation, the sign SLEEP is signed with a  -hand next to the side of the head (cheek and ear), palm oriented toward the head; also, the

head usually tilts slightly towards the palm. EAT is signed in front of the mouth with a flat 𓂋-hand, fingertips oriented towards the mouth, and a repeated movement. In the compound, as signed today, only the handshape of EAT is retained and the hand performs a single movement from the cheek just below the ear towards the corner of the mouth or the chin, fingertips oriented towards the head throughout. Without knowing the history of the sign, it would probably be impossible to reconstruct the underlying components.

Consequently, given the notorious scarcity of historical sign language data, strong claims about the absence of a certain type in a particular sign language should be made with caution.

1.1 Native compounds

Native compounds are those that are formed independently of the compounds existing in the surrounding spoken language. Within the group of native compounds, we distinguish sequential and simultaneous compounds; there are semantic and syntactic differences within each group.

There are various views on the internal structure of compounds and consequently, compounds are divided into different groups by different researchers. As a result, the same term may be used by different authors for different divisions; see Lieber & Štekauer (2010) and Scalise & Vogel (2011), and references therein. A classification motivated by sign language compounds is proposed in Vercellotti & Mortensen (2012). Some researchers use the term "syntactic compounding" for productive forms, and "root compounding" for lexicalized forms. The categorization we use here is merely one practical way of dividing compounds into their subgroups. Needless to say, others can also be used.

1.1.1 Sequential compounds

In sequential compounds, one component is signed after the other one. In some sequential compounds, the full form of each sign is retained, while in others characteristic phonological reduction or assimilation [Phonology – Section 3.1] / assimilation processes apply in one or both of the stems that form the compound (see the section on semi-simultaneous compounds [Morphology – Section 1.1.2.2]).

1.1.1.1 Semantic structure

From the point of view of the semantic structure of compounds, some are transparent in meaning, whereas in others, the parts do not give an indication about the meaning of the compound. The former are referred to as "endocentric", the latter as

"exocentric" compounds (and this is not to be confused with the syntactic notions "headed" and "non-headed" which we define in the next section).

1.1.1.1.1 Endocentric compounds

In endocentric compounds, the meaning is predictable from the parts. In other words, these compounds are semantically compositional. Similar to phrases, this group is productive and the forms are not necessarily lexicalized. In many sign languages, this is probably the most common form of creating neologisms or of expanding the lexicon. The following examples are representative of endocentric compounds; the second and the third are illustrated by videos below.

FOOD^PLACE ('kitchen') (TİD)
MONK^BOSS ('abbot') (DGS, Leuninger 2001: 186)
SLEEP^DRESS ('pyjamas') (ASL, Klima & Bellugi 1979: 208)

4_1.1.1.1.1_1_DGS_MONK^BOSS

MONK^BOSS ('abbot', DGS)

4_1.1.1.2.1_1_ASL_SLEEP^DRESS

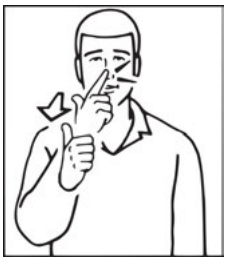
SLEEP^DRESS ('pyjamas', ASL)

In the examples, a kitchen is a place for making food, an abbot is the boss (head) of a group of monks, and pyjamas are a type of dress worn for sleeping.

1.1.1.1.2 Exocentric compounds

In contrast, in exocentric compounds, the meaning is not predictable from the parts, as illustrated by the following examples. The first one, from Auslan, is shown in the image below.

NOSE^GOOD ('lucky') (Auslan, Johnston & Schembri 2007: 133)
TOOTH^YELLOW ('rat') (SSL, Wallin 1983: 64)
RED^SECRET ('strawberry') (ASL, Klima & Bellugi 1979: 214)
GOD^WAIT ('advent') (DGS, Leuninger 2001: 185)



NOSE^GOOD ('lucky') (Auslan)

Obviously, a rat is not a type of tooth (and neither is it a type of yellow) and strawberries are not a type of secret (although they are red). Similarly, the concept 'lucky' may refer to something positive (good) but is not transparently related to nose.

Some compounds appear to be midway between endocentric and exocentric. The DGS example GOD^WAIT ('advent') may be such a case. While advent does not literally imply waiting for God, this meaning may still be semi-predictable. The grammar writer should decide how to present such cases.

Note that instead of the terms "endocentric" and "exocentric', the terms "semantically predictable" and "semantically unpredictable" may be preferred. This might be a better solution, as the terms exocentric and endocentric are sometimes used for what we classify as subordinate [Morphology – Section 1.1.1.2.1] and coordinate [Morphology – Section 1.1.1.2.2] compounds. Some researchers make a three-way distinction, cutting across semantic and syntactic criteria as: endocentric, exocentric, and coordinate.

1.1.1.2 Syntactic structure

A second important distinction concerns the syntactic structure of compounds. Irrespective of whether its meaning is predictable or not (that is, whether it is endocentric or exocentric), a compound can be headed or non-headed/double-headed. In other words, the components of a compound can be in a relationship where one is subordinate to the other (being a modifier or a complement: subordinate compounds), or they may be structurally symmetrical (coordinate compounds). Examples for the first type are *red wine* (endocentric) and *red herring* (exocentric), where *red* is an adjective modifying the following noun. Examples of the second type are *north-west*, *Alsace-Lorraine*, and *singer-songwriter* (semantically predictable), and *bittersweet* (semantically unpredictable).

1.1.1.2.1 Subordinate compounds

Subordinate compounds ("headed compounds") have an internal categorical head, which, however, does not (necessarily) overlap with the semantic head of the compound. For example, the exocentric ASL compound RED^SECRET ('strawberry') above has a head, which is SECRET, and which is modified by RED. However, the meaning is not transparent. Other subordinate sign language compounds are the following from ASL and TİD:

4_1.1.1.2.1_1_ASL_SLEEP^DRESS

SLEEP^DRESS ('pyjamas')

(ASL, Klima & Bellugi 1979: 208)


DOCTOR^PLACE ('hospital') (TİD)


SAY^BAD ('swear') (TİD)

1.1.1.2.2 Coordinate compounds

In coordinate(d) compounds – also called "co-compounds" or "dvandva compounds" – two (or more) components stand in a structurally symmetrical relationship. In one type, the components of the compound are different entities that are members of a higher category (i.e. a hypernym). In the ASL compound meaning 'vehicle', for instance, the signs for three sub-types of vehicles are combined. In this case, there would in principle be more options while in the NGT compound FATHER^MOTHER ('parents'), which is illustrated by two images below, the combination is exhaustive.

CAR^PLANE^TRAIN ('vehicle') (ASL)

In principle, a coordinate compound might also be characterized by the fact that both components refer to the same entity (as in the English compounds *singer-songwriter* and *hunter-gatherer*). That is, a vehicle is either a car or a plane or a bus, and a parent is either a father or a mother, but a singer-songwriter is a singer *and* a songwriter.

FATHER^MOTHER ('parents') (NGT)

We are only able to present the following hypothetical example for this type of coordinate compound.

CAR^BUS ('minibus', hypothetical)

In yet another type, the two components, which again stand in a structurally equal relationship, are nevertheless unrelated to each other. These compounds are mostly semantically unpredictable. Two examples from TİD are given below. The second one, which is illustrated by two images showing the beginning and end point of the sign, is also attested in various other sign languages.

THINK^PUT ('remember') (TİD)

EAR^MOUTH ('deaf') (TİD)

1.1.1.3 Compounds involving SASS

We treat compounds involving a Size-and-Shape-Specifier [Morphology – Section 5.2] / Size-and-Shape-Specifier (SASS) separately, as in these compounds, it is not always

clear what the head is; it might be that at least some of these are actually double-headed compounds. In this type, a lexical stem combines with a SASS. The examples discussed in the literature suggest that in compounds of this type, the SASS usually follows the lexical sign, as in the following examples from TİD and NGT. The NGT example is illustrated by six images (the first two show the sign SWIM, the other four the SASS).

D-V-D^SASS$_{round}$ ('DVD') (TİD)

SWIM^SASS$_{square}$ ('swimming pool') (NGT)

Of course, SASS may also modify nouns in general, thereby fulfilling the function of an adjective [Lexicon – Section 3.4] / adjective which specifies the shape of an object (as e.g. MIRROR SASS$_{round}$), but examples like those provided above are clearly lexicalized, as SWIM^SASS$_{square}$ refers to swimming pools in general, irrespective of their shape.

In the case of DVD, since these only come in a round shape, the SASS is semantically superfluous (almost like speaking about a 'round circle'), and it is not the modifier of D-V-D.

1.1.2 Simultaneous and semi-simultaneous compounds

It is not always easy to assign the compounded forms of sign languages to a particular class, as compounding is not the only word formation process involving two stems.

In Section 1.0. "Definitions and challenges", we already pointed out that blends and clippings are also formed by the combination of more than one stem.

These distinctions sometimes get blurred in the description of compounded forms even in spoken languages on which the definitions are drawn; when it comes to sign languages, the distinction is even harder to make. An overwhelming number of simultaneous compounds contain reduced stems and as a result, they might be considered blends from a phonological point of view, although syntactically they may contain heads. When it comes to sequential compounds, even the majority of these include reduced stems, as repetition within a stem is generally omitted when two stems are combined. Interestingly, some sign language researchers even use the term "blend" for a subgroup of what is described here as simultaneous compounds (see e.g. Klima & Bellugi 1979: 330).

It is thus necessary to apply the relevant criteria to compounded forms and evaluate the results for the sign language in question. In the following sections, we distinguish between simultaneous compounds, which have no equivalent in spoken languages, and semi-simultaneous compounds, which resemble blends.

1.1.2.1 Simultaneous compounds

In simultaneous compounds, the two components of the compound are expressed simultaneously on the two manual articulators, that is, all compounds of this type are two-handed, with one hand articulating (part of) one sign while the other hand simultaneously articulates (part of) another sign. Types differ with respect to the recoverability of the input forms as full stems, but most of these compounds involve reduced forms.

In full forms of simultaneous compounds, the two signs that make up the compound retain their phonological form. By definition, this implies that both signs are one-handed and that in the compound, one of the signs is shifted to the non-dominant hand. As we were not able to find clear examples of this type, we present a hypothetical example for the sake of illustration. In the compound below meaning 'blind', the sign SEE is articulated by the dominant hand and the sign ZERO by the non-dominant hand; the lexical forms of both these signs are one-handed.

SEE(h1)^ZERO(h2) ('blind', hypothetical)

Note that it may be tempting to analyze two-handed lexicalized classifier constructions as simultaneous compounds involving full forms. Consider, for instance, the NGT signs TEA and WRITE. In both signs, the dominant hand is a handle classifier [Morphology – Section 5.1.3] indicating the manipulation of a small or thin object (dipping a tea bag and holding a pen, respectively) while the non-dominant hand is a static entity classifier [Morphology – Section 5.1.1] (a  -hand depicting a cylindrical object, the tea cup, and a  -hand depicting a flat object, the sheet of paper). All components involved ($\text{DIP}_{\text{small.object}}$ and CUP, HOLD_{pen} and SHEET) could

in principle be one-handed signs, and the resulting complex forms could thus be argued to be full-form simultaneous compounds. The grammar writer may wish to mention these cases and/or refer the reader to the relevant section in the Lexicon Part.

As for simultaneous compounds including full forms, one should be also aware of the fact that there may be unusual forms, such as FACEBOOK, which, in some sign languages, involves the sign BOOK articulated in front of the face. Here, 'face' is not a sign, it is a signifier, in other words, a case of "language mention". There might be other cases – even in phrases – in which a body part is not a sign but rather refers to just a body part. The grammar writer may want to include such cases in the grammar, as they are intriguing from a typological perspective, but it should be made clear that they are special cases, as they do not involve the combination of two lexical signs.

Across sign languages, reduced forms appear to be much more common. In such compounds, one or both of the input signs are two-handed but in order to be expressed simultaneously with the other sign, one of the hands in the input sign(s) is deleted. One example is the BSL sign meaning 'minicom'. Another one is the NGT compound SATURDAY(h1)^SUNDAY(h2) ('weekend') illustrated below. Both input signs are symmetrical two-handed signs that are articulated in neutral signing space: SATURDAY is articulated with two -hands making contact, SUNDAY with two -hands making contact. In the compound, one hand has an -handshape, the other a -handshape, and both hands contact each other, as shown in the second image (it does not matter which hand takes on which handshape).

PHONE(h1)^TYPE(h2) ('minicom') (BSL, Brennan 1990)

SATURDAY(h1)^SUNDAY(h2) ('weekend') (NGT)

The grammar writer should be careful about whether the two hands in these reduced simultaneous compounds necessarily share a location.

A special type of simultaneous compounding is numeral incorporation [Syntax – Section 4.3.4] / numeral incorporation (Ktejik 2013; Liddell 1997). Numeral incorporation generally results in a one-handed sign which fuses phonological components of two independent signs. As the name implies, one of the two base signs is a numeral, while the other is often a time term (day, week, etc.), a currency (e.g. dollar), or a pronoun. In its base form, the NGT sign WEEK is articulated with a -hand that performs a straight downward movement in neutral signing space; this handshape may be replaced by a numeral handshape, e.g. the -hand for 'two', resulting in the sign TWO-WEEK.

1.1.2.2 Semi-simultaneous compounds

"Semi-simultaneous" refers to a continuum. In some cases, the two components – albeit reduced – are still clearly sequentially organized while in others, the forms become unrecognizable. In other words, the signs, which are actually combined sequentially, undergo phonological reduction and assimilation [Phonology – Section 3.1.1] / assimilation to the extent that one or both input forms are not independently distinguishable as meaningful stems any more (remember, for instance, the ASL example SLEEP^EAT ('home') discussed in the section "Methodological challenges" [Morphology – Section 1.0.3]). This type should thus be considered in light of the discussion of phonological and prosodic properties [Morphology – Section 1.4] of compounds. In fact, the grammar writer might even decide to be very brief about semi-simultaneous compounds, shifting the discussion of examples to the section on phonological and prosodic characteristics of compounds.

Another example of a semi-simultaneous compound involving movement reduction and handshape assimilation is the DGS compound GOD^WAIT ('advent'), mentioned before. GOD is signed with a -hand fairly high in the signing space with a slight upward movement; WAIT involves a -hand making repeated contact close to the ipsilateral shoulder. In the compound, the -hand moves from the position in the signing space towards the shoulder and makes contact once; that is, we observe (i) loss of movement in the first part, (ii) loss of repetition in the second part, and (iii) progressive handshape assimilation. The ASL compound SLEEP^EAT ('home') is illustrated by means of a video below.

GOD^WAIT ('advent') (DGS, Leuninger 2001: 185)
THINK^MARRY ('believe') (ASL, Liddell & Johnson 1986: 490)

4_1.1.2.2_1_ASL_SLEEP^EAT

SLEEP^EAT ('home') (ASL)

1.2 Loan compounds

Sign languages are always in contact with the surrounding spoken languages and this is reflected in the use of mouthings, the use and lexicalization of fingerspelling, and, last but not least, in the borrowing of compound structures (see also the section on calques [Lexicon – Section 2.2.1] / calques in the Lexicon Part).

Loan compounds mirror the makeup of compounds found in the surrounding spoken language; they come in two types: faithful loans (also referred to as "1-to-1 loans") and modified loans. There is a possibility that all loan compounds are sequential, and, that if a compound is simultaneous, it is native. We do not have the resources to test this, but the grammar writer should be aware of this possibility.

Let us point out that compounds which are made up of forms that are combined in a predictable and productive way (e.g. APPLE^PIE, TEA^CUP) are not included in the discussion below because they should not be thought of as borrowings. In other words, the fact that the sign language compound resembles a compound of the spoken language may simply reflect a universal tendency in compound formation, and not a translation of the parts.

1.2.1 Faithful loans

In faithful loans, the structure of the compound mirrors that of a compound attested in the spoken language in a one-to-one fashion. For instance, the NGT compound BLOOD^NOSE ('nosebleed') mirrors the structure of the Dutch compound *bloedneus* (see images below). A clear case of a faithful loan is the Inuit SL compound EYEBROW^BELLY, an exocentric compound meaning 'white man' (the index finger moves from the eyebrow to the belly, making contact at both locations). In Inuktitut, the surrounding spoken language, the same compound is used (*qallu-naaq*).

BLOOD^NOSE ('nosebleed') (NGT)

EYEBROW^BELLY ('white man') (Inuit SL, Schuit 2013: 152)

1.2.2 Modified loans

Occasionally, within the borrowed compound, the order of signs may be reversed in order to comply with phonological tendencies (ease of articulation). Generally, the reversal allows for a smoother integration of the components within one movement contour. We refer to these cases as "modified loans". For instance, the German word for sunflower is *Sonnenblume*, which has the same sequential structure as its English equivalent. In DGS, however, the order of the two parts is reversed, the reason being that FLOWER is articulated with an upward movement in front of the signer's body while SUN has its place of articulation above the signer's head. Thanks to the reversal, there is no need to start high (SUN), move down to the initial location of FLOWER, and then move up again.

FLOWER^SUN ('sun flower') (DGS)

Similarly, in the NGT compound POST^LAMP ('lamp post'), the element that comes second in the corresponding Dutch compound is signed first in the NGT compound in order to allow for a smooth transition to the second part (LAMP) which is signed higher in space. In the illustration below, the first two images show the beginning and end point of POST while the rightmost image depicts the sign LAMP.

POST^LAMP ('lamp post') (NGT)

In principle, modified loans could also have the form of simultaneous compounds. In this case, (parts of) the signs corresponding to the two words that make up the

compound would be signed simultaneously in the way described in the section on simultaneous compounds [Morphology – Section 1.1.2.1]. However, we were not able to find an example of this type of modified loan.

1.3 Compounds with fingerspelled components

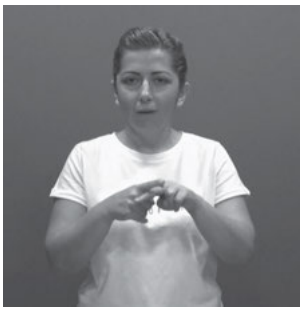
In these compounds, one component is fingerspelled, i.e. taken from the manual alphabet. The fingerspelled component may contain one or more fingerspelled letters. These compounds can be sequential or simultaneous.

1.3.1 Sequential

In the sequential cases, the fingerspelled component may precede or follow the stem. Some compounds in this group are more native-like, while others are more loan-like.

1.3.1.1 Native-like

Native-like compounds with a fingerspelled component are original to the sign language, that is, their form does not correspond to the form of the same concept in the spoken language. In TİD, for instance, the fingerspelled letters A-L – the first two letters of the loan word *alarm* ('alarm') in Turkish – may combine with the sign SOUND to yield the meaning 'alarm', as shown below. (Note that the corresponding Turkish word is not a compound.)




A-L^SOUND ('alarm') (TİD)

1.3.1.2 Loan-like

In contrast, in sequential loan-like compounds including fingerspelled components, the internal structure and components are copied from the spoken language. In ASL,

for instance, the compound meaning 'dead-end' consists of two components, just like the English original. These are sequentially combined in the same way as in English, but the second component is represented by a fingerspelled word. The same is true for the compound meaning 'bellboy', but here the fingerspelled word precedes the sign.

DEAD^E-N-D ('deadend street') (ASL, Padden 1998: 53)
B-E-L-L^BOY ('bellboy') (ASL, Padden 1998: 54)

1.3.2 Simultaneous

In simultaneous compounds involving fingerspelling, a fingerspelled letter and a classifier are expressed simultaneously. For instance, the TİD form meaning 'playstation' consists of the letter P on the dominant hand and a classifier on the non-dominant hand (left image below) (and optionally a second independent sign, shown in the right picture below).


P^CL ('playstation') (TİD)

Such two-handed signs distinguish simultaneous compounds involving fingerspelling from very similar forms that are cases involving initialization [Lexicon – Section 2.2.2.1]. In initialization, the handshape of the sign is the alphabet handshape for the first letter of the corresponding word from the surrounding spoken language; this handshape either replaces the handshape of a lexical item (e.g. in NGT, the sign DRINK signed with a 𝒱-hand for 'wine') or combines with an underspecified root (e.g. the ASL signs TEAM, SOCIETY, FAMILY, ASSOCIATION, which share location and movement but are all signed with the handshape corresponding to the first letter of the English word; cf. Fernald & Napoli (2000), who refer to such groups of signs as "lexical families").

1.4 Phonological and prosodic characteristics

It is common for the components of sign language compounds to undergo characteristic assimilation [Phonology – Section 3.1.1] / assimilation and reduction processes. These changes may affect all phonological parameters (handshape, location, movement, and orientation) as well as handedness patterns. In the following sections, we discuss the most important phenomena in more detail. Clearly, as far as examples are concerned, this section will overlap with the previous sections, as all semantic and syntactic types of compounds may be characterized by phonological and prosodic changes.

1.4.1 Phonological characteristics

Occasionally, the order in which the components appear in a sign language compound is reversed in comparison to the spoken language compound from which it is borrowed. Frequently, this reversal is motivated by a tendency for a smooth, uninterrupted movement contour. In the NGT compound POST^LAMP ('lamp post'), not only the order of components is reversed, but the first component POST also has an upward instead of a downward movement. Hence, we are dealing with a phonological change which is due to the fact that the second component LAMP is signed higher in the signing space. Thus, thanks to the reversal, no transitional movement is required between POST and LAMP. Similar changes are also observed in native compounds, such as, for instance, DGS MONK^BOSS ('abbot'). The lexical form of BOSS has an upward movement in front of the torso ( -hand). However, given that the first part of the compound, MONK, is signed with a -hand performing a circular movement around the head, BOSS receives a downward movement in the compound, thus allowing for a continuous movement.

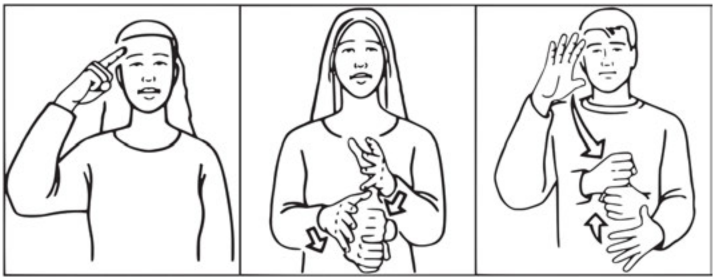
POST^LAMP ('lamp post') (NGT)
MONK^BOSS ('abbot') (DGS, Leuninger 2001: 186)

Besides movement alterations, handshape alterations are also frequently observed. These may involve partial or complete handshape assimilation which may be regressive (affecting the first component of the compound) or progressive (affecting the second component). As an example, consider the Auslan compound SEE^MAYBE ('check'). The first sign SEE has a -hand in its citation form, while the second part MAYBE is articulated with a -hand. In the compound, the thumb and the pinky are already extended in the first component, resulting in a handshape with extended thumb, index, and pinky (-hand). That is, we are dealing with partial regressive handshape assimilation. Another example, the DGS compound GOD^WAIT ('advent') has already been described above; this compound involves complete progressive handshape assimilation.

SEE^MAYBE ('check') (Auslan, Johnston & Schembri 2007: 131)
GOD^WAIT ('advent') (DGS, Leuninger 2001: 185)

Other interesting phonological changes are attested in sign language compounds in which one of the two components – usually the second one – is two-handed (Sandler 1993). In this case, one often observes “weak hand spread”; that is, the non-dominant hand of the second component is already in place while the first (one-handed) sign is articulated. In the Auslan compound THINK^HOLD (‘believe’), this is the -hand, which is held in neutral signing space while the dominant hand articulates THINK at the temple (note that in this example, we also observe total regressive handshape assimilation: THINK is signed with a -hand instead of a -hand). Similarly, in the ASL compound BLACK^NAME (‘bad reputation’), the weak hand of NAME (a -hand) is already positioned in neutral signing space while the dominant hand articulates BLACK.

THINK^HOLD (‘believe’) (Auslan, Johnston & Schembri 2007: 132)
BLACK^NAME (‘bad reputation’) (ASL, Klima & Bellugi 1979: 218)



THINK^HOLD (‘believe’) (Auslan)

4_1.4.2_1_ASL_BLACK^NAME
BLACK^NAME (‘bad reputation’) (ASL)

Another change affecting handedness turns the first component, which is one-handed, into a symmetrical two-handed sign in case the second component is also a symmetrical two-handed sign. An example of this phenomenon is the ASL compound SLEEP^DRESS (‘pyjamas’). SLEEP is one-handed and signed with a -hand in front of the face; DRESS is two-handed and articulated with two -hands in front of the trunk. Both signs have a downward movement. In the compound, SLEEP becomes two-handed and the two movements are fused into one.

SLEEP^DRESS (‘pyjamas’) (ASL, Klima & Bellugi 1979: 208)

1.4.2 Prosodic characteristics

Prosody [Phonology – Chapter 2] / prosody is a cover term for stress, rhythm, and intonation. It has been found that in many sign languages, it is very common for

compounds to undergo specific prosodic changes. For example, with respect to rhythm, one or both parts of the compound often lose inherent repetition, such that the compound is shorter than the two signs stringed together in a phrase. For instance, as independent signs, both the ASL signs RED and SECRET involve repetition, whereas in the compound RED^SECRET ('strawberry'), each member only retains a single movement. In the DGS compound GOD^WAIT ('advent') and the ASL compound BLACK^NAME ('bad reputation'), the respective second parts lose their inherent repetition.

RED^SECRET ('strawberry') (ASL, Klima & Bellugi 1979: 214)
GOD^WAIT ('advent') (DGS, Leuninger 2001: 185)
BLACK^NAME ('bad reputation') (ASL, Klima & Bellugi 1979: 218)

In addition, two movements may be fused into one such that the compound consists of only one syllable [Phonology – Section 2.1.1] / syllable. We have already observed this type of change in the ASL compound SLEEP^DRESS ('pyjamas') discussed above, where both input signs involve a downward movement. Similarly, in the ASL compound NUDE^ZOOM-OFF ('streaker'), both input signs have a single forward movement, which are fused and appear as a single syllable in the compound. Obviously, fusion of movement may depend on phonological changes affecting movement, as explained in the previous section.

SLEEP^DRESS ('pyjamas') (ASL; Klima & Bellugi 1979: 208)
NUDE^ZOOM-OFF ('streaker') (ASL, Klima & Bellugi 1979: 199)

Elicitation materials

To the best of our knowledge, to date, there is no elicitation material that is designed for the main purpose of eliciting compounds. In fact, it is not clear what such elicitation material should look like. Obviously, one way to proceed would be to use picture stimuli including objects that are likely to be expressed by compounds, but this assumed likelihood will always be based on patterns existing in the spoken language; in other words, native compounds are likely to be missed using such a procedure.

Some methods that have already been used for testing whether a compound exists: If a particular sign language already has a dictionary, then checking the signs it contains with native speakers by asking them about the forms is a method that has general validity (Vercellotti & Mortensen 2012). Another method for languages with dictionaries might be for one informant to describe an object that is expressed through compounding (without using any of the words in the compound), and for the other to guess the form, and to see whether the result is a compound. Checking if new objects can be named through compounding has also been used (Meir et al. 2010).

Another method might be to combine arbitrary stems in order to see if compounds consisting of those stems exist.

References

Main sources on compounding in sign languages:

Klima, E. & U. Bellugi. 1979. *The signs of language*. Cambridge, MA: Harvard University Press.

Liddell, S.K. & R.E Johnson. 1986. American Sign Language compound formation processes, lexicalization and phonological remnants. *Natural Language and Linguistic Theory* 4(4). 445–513.

Meir, I. 2012. Word classes and word formation. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 77–112. Berlin: De Gruyter Mouton.

Meir, I., M. Aronoff, W. Sandler & C. Padden. 2010. Sign languages and compounding. In S. Scalise & I. Vogel (eds.), *Cross-disciplinary issues in compounding*, 301–322. Amsterdam: John Benjamins.

Vercellotti, M.L. & D.R. Mortensen. 2012. A classification of compounds in American Sign Language: an evaluation of the Bisetto and Scalise framework. *Morphology* 22. 545–579.

Wallin, L. 1983. Compounds in Swedish Sign Language. In J. Kyle & B. Woll (eds.), *Language in sign*, 56–68. London: Croom Helm.

General sources on compounding:

Bat-El, O. 2006. Blend. In K. Brown (ed.), *Encyclopedia of language and linguistics, Vol. 2* (2nd edition), 66–70. Oxford: Elsevier.

Bauer, L. 2006. Compound. In K. Brown (ed.), *Encyclopedia of language and linguistics, Vol. 2* (2nd edition), 719–726. Oxford: Elsevier.

Fabb, N. 2001. Compounding. In A. Spencer & A. Zwicky (eds.), *The handbook of morphology*, 67–83. Oxford: Blackwell.

Lieber, R. & P. Štekauer (eds.). 2011. *The Oxford handbook of compounding*. Oxford: Oxford University Press.

Scalise, S. & I. Vogel (eds.). 2010. *Cross-disciplinary issues in compounding*. Amsterdam: John Benjamins.

Štekauer, P. & R. Lieber. 2005. *Handbook of word formation*. Dordrecht: Springer.

Spencer, A. & A. Zwicky (eds.). 2001. *The handbook of morphology*. Oxford: Blackwell.

Chapter 2 Derivation

2.0 Definitions and challenges

2.0.1 What is derivation?

Derivation is the formation of a new lexeme from another lexeme. In the literature, the term “derivation” is commonly used to refer only to processes of derivational affixation, that is, the combination of a stem with an affix. The stem that is involved is often,

but not always, a freely occurring lexical element (compare e.g. *national-ism* and *fasc-ism*), which, however, may undergo certain phonological changes in the process. Derivational affixes – in contrast to inflectional affixes – are capable of changing the category of a word (e.g. from verb to noun).

In this chapter, we only talk about derivational markers, affixes which create lexemes from other lexemes. We sometimes use the terms derivation and derivational affixation interchangeably. However, the grammar writer should keep in mind that affixation is not the only available strategy. For instance, some forms of compounding [Morphology – Chapter 1] / compounding may fulfil the function of derivation, and in some languages, reduplication is used to derive a lexeme from another lexeme.

2.0.2 How is derivation marked?

Across spoken languages, the most common strategy of derivational marking is affixation. In most cases, the affix is either a prefix (as the English negative prefix *in-* in *in-tolerant*) or a suffix (as the English nominalizing suffix *-er* in *play-er*), but other types of affixes are attested, e.g. infixes and circumfixes. As mentioned above, derivational affixes may change the word category (as in *play-er*), but this is not always the case; that is, derivational markers do not have to be category-changing (cf. *in-tolerant*). It is a characteristic of English that mainly suffixes may change the category of a word, as the category-determining head of the word is on the right (the same holds for English compounds). However, other languages may behave differently in this respect. Moreover, various derivational affixes may be combined, as in *nation-al-ism* and *in-san-ity*. In the first case, an adjective is derived from a noun and subsequently, another noun is derived from this adjective. The word-internal structure can thus be represented as follows:

$$[\,[\,[\,\textit{nation}\,]_{N}\,\textit{–al}\,]_{A}\,\textit{–ism}\,]_{N} \qquad \text{(English)}$$

As for the example *in-san-ity*, two scenarios are possible: either suffixation (which derives a noun from an adjective here) precedes prefixation (which is category-preserving in this case), or vice versa.

However, affixation is not the only derivational strategy. First, derivation may be marked by modifying the stem (stem modification), for instance, by a change in consonant or vowel quality (ablaut/apophony and umlaut are two processes that affect vowels). This is true for the English verb-noun pair *sing* –*song* as well as for the Dutch pair *help-en* – *hulp* ('help-INF – help_{N}'). To make things more complex, regular affixational derivation may go hand in hand with a stem modification, as in the following German examples. The first example illustrates that *-e* is a nominalizing suffix in German. In the second and third example, suffixation is accompanied by a modification of the stem vowel, ablaut in the second example and umlaut in the third. Note that in the first two examples, the input to the derivational process is a verb while in the third one, it is an adjective.

glaub-en ('believe-INF') → *Glaub-e* ('believe-N' = belief/faith)
helf-en ('help-INF') → ***Hi**lf-e* ('help-N')
rot ('red') → *R**ö**t-e* ('red-N' = redness) (German)

A combination of affixation and stem modification is also attested in English, e.g. in the nominalization *destruct-tion* (from the verb *destroy*). In this case, the stem-internal change is more dramatic, as it does not only affect the stem vowel but also the (final) consonant. Sometimes the changes may be so severe that the relationship between the members of the pair is not transparent anymore. Consider, for instance, the following verb-noun pair from German.

zieh-en ('pull-INF') → *Zug* ('train, drag, move, draft') (German)

Probably, only someone who knows about the history of German will know that the verb and the noun are related. In such cases, one would probably not want to posit a derivational rule that relates the two words. Rather, they would be treated as a case of (partial or full) suppletion and would thus be listed separately in the lexicon.

Finally, derivational processes may occasionally be realized by means of reduplication, that is, by the repetition of (a part of) a stem. Thus, in this case, we are not dealing with a derivational marker with a fixed form. Rather, the form of the marker depends on the form of the stem. Two examples are given below; the first one involves total reduplication of a stem (noun → adjective), the second one reduplication of a part of the stem (verb → noun).

kandu ('blood') → *kandukandu* ('red')
(Kayardild, Evans 1995, in Rubino 2005: 21)
giak ('send') → *gigiak* ('messenger')
(Tigak, Beaumont 1979, in Rubino 2005: 21)

In the above examples, including the reduplication case, derivation involves segmental material. Besides that, derivation may also be marked by suprasegmental changes, that is, by change of tone or stress pattern. In Chinese, a tone language, the former type of change is attested in some verb-noun pairs; in the example below, the stem vowel of the verb carries a low tone, while the corresponding noun has a high tone. In English, too, suprasegmental changes are attested, as is illustrated by the examples in the second line: the verbs carry stress on the second syllable, while the nouns carry stress on the first syllable.

còng ('to follow') → *cóng* ('follower, persecutor') (Chinese)
to permít → *the pérmit* / *to convért* → *the cónvert* (English)

Finally, it is important to realize that occasionally, word category changes are not overtly marked at all; consider e.g. the English noun-verb pairs *(the) paint – (to) paint* and *(the) love – (to) love*. Obviously, it is only in context that the grammatical category can be determined. This kind of derivation is referred to as zero derivation or conversion.

2.0.3 Methodological challenges

The discussion above already suggests a couple of potential challenges that a researcher investigating derivation in a sign language may face. First, a derivational process may not be marked at all. Second, a change signaling a derivational process may be very subtle. In fact, noun-verb pairs in sign languages (in particular, ASL) were long thought to be formationally identical exactly for the latter reason: the systematic changes that do exist are rather subtle and are thus easily overlooked.

Another common challenge is that a (hearing) researcher may be biased by processes that are attested in the spoken language. As for this potential bias, two facts have to be acknowledged. First, two lexemes that are related in the spoken language may not be related at all in the sign language. For instance, the English noun-verb pair *(the) fish – (to) fish* represents a case of conversion. In a sign language, however, it is very likely for the corresponding two lexemes not to show any formal relationship, that is, not to be derivationally related. Secondly, a complex word form may be misinterpreted as a case of affixation simply because the corresponding form in the spoken language is clearly derived by a derivational affix. Let us illustrate this point with an example. In NGT, nouns can be derived from verbs by means of the sign PERSON, as in the following two examples.

BAKE → BAKE^PERSON ('baker') (NGT)
DANCE → DANCE^PERSON ('dancer') (NGT)

In Dutch, just as in English, this process corresponds to an *-er* nominalization, that is, a process that is clearly affixal. It has therefore been suggested that PERSON is a nominalizing (agentive) suffix. Such a conclusion, however, may be premature. After all, PERSON is a noun that can also appear by itself, that is, it is not a bound morpheme. It is well-known that derivational affixes may diachronically derive from free lexemes in a process of grammaticalization, but it is far from clear that PERSON has undergone such a diachronic change. It thus seems more likely that what we are dealing with is an instance of compounding and that an analysis of such cases as affixation has been influenced by a parallelism with the spoken language pattern. The most reliable way to determine whether a form is an affix or a stem takes into account that stems (i) usually occur on their own and, related to this, (ii) are prosodically separate items. Affixes cannot stand alone and are integrated into the prosodic pattern of the word (a property which also separates them from clitics). In other words, taking English as comparison, an example like BAKE^PERSON might correspond to *baker-man* in form, rather than to *baker* (note that PERSON in NGT also attaches to nouns, as e.g. SPORT^PERSON ('sportsman') and ART^PERSON ('artist').

Another serious challenge in the identification of systematic derivational processes is the fact that sometimes one and the same process may be signaled by various phonological changes – alone or in combination. That is, the changes may be far from systematic and may differ between and even within signers, as has been shown for

noun-verb pairs in RSL by Kimmelman (2009). The grammar writer will have to decide whether s/he wants to include (apparent) derivational patterns that occur only rarely in the data, apply to only very few lexemes (maybe only a single one), or show a lot of variation across and/or within signers. A possible strategy would be to include such cases and explicitly mark them as exceptional (pending further research).

Derivational forms, in addition, may be irregular; that is, they may not apply to a whole class, unlike most cases of inflection [Morphology – Chapter 3] / inflection. For instance, the suffix *-al* in English does not apply to all verbs (cf. *arrival*, *postal*, but not **comal*, **mailal*).

2.1 Manual markers of derivation

As with compounds [Morphology – Chapter 1], an important basic distinction is that between manually realized and non-manually realized derivational processes. As for the former, they may be realized by the addition of segmental material; that is, sequentially by means of affixation, or by the change of segmental material, that is, simultaneously by means of stem modification. In contrast, to the best of our knowledge, non-manual derivation is always simultaneous.

2.1.1 Sequential derivation

To date, only very few unambiguous examples of sequential derivational processes have been identified in sign languages. It has thus been suggested that (i) sign languages have a general preference for simultaneous morphology and (ii) that many sign languages may be too young to have already developed sequential derivational markers (from free lexemes) (Aronoff et al. 2005). In the following sections, we describe three processes that have been identified in the literature. However, the grammar writer should be aware that in the sign language under investigation, other processes may exist that have not previously been described. Moreover, as we will see shortly, at least the first two examples discussed are ambiguous with respect to the word formation process. Despite the unclear status of these examples, we include them so that the grammar writer gets an idea what to look for.

2.1.1.1 Agentive

An agentive marker derives an agentive noun from a verb or another (non-agentive) noun. In the introduction to this chapter, we already discussed the English agentive suffix *-er*, which attaches mostly to verbs (e.g. *player*, *painter*), and we problematized the fact that corresponding processes in sign language may not be affixal but rather instances of compounding.

Still, it has been suggested for ASL that it employs an agentive suffix, which Aronoff et al. (2005) gloss as AGENTIVE. They point out that this agentive suffix has indeed been derived from the independent sign PERSON. Still, they consider it a suffix, as it does not have the same distribution as English *-er*. For instance, in ASL AGENTIVE may combine with the verb OPERATE, while English uses the non-derived noun *surgeon* instead. That is, the ASL suffix developed its own pattern of distribution. While this difference is certainly interesting, it furnishes only weak evidence for analyzing AGENTIVE as an affix (after all, OPERATE^PERSON might also be a native compound). Moreover, Aronoff et al. observe that, when combined, the lexical sign and AGENTIVE may undergo various reduction and assimilation [Phonology – Section 3.1.1] processes, but remember that such processes are not necessarily indicative of derivation as they also commonly characterize compounding (see section on semi-simultaneous compounds [Morphology – Section 1.1.2.2]). Combination of AGENTIVE with the sign TEACH is illustrated by the video below.

OPERATE^AGENTIVE ('surgeon') (ASL, Aronoff et al. 2005: 330)

4_2.1.1.1_1_ASL_TEACH^AGENTIVE

TEACH^AGENTIVE ('teacher') (ASL, Aronoff et al. 2005: 313)

What these examples illuminate once again is that the grammar writer should approach the issue of derivational affixation versus compounding with caution. Beyond identifying a certain word-formation process, it may be important to also scrutinize the constraints on its application. Should the evidence not allow for an unambiguous classification of an element (e.g. PERSON vs. AGENTIVE), the grammar writer may still want to mention it as a possible candidate for a derivational affix, adding a note that further research is necessary to determine the status of the element and thus the word formation process.

2.1.1.2 Negative

Cases of derivational negation that have been described in the literature pose methodological challenges similar to those described for the agentive. In this section, we briefly describe two examples that may serve as a starting point for the grammar writer to search for elements with a similar function in the sign language under consideration. Aronoff et al. (2005) and Meir (2004) describe negative suffixes for ASL and Israeli SL. The Israeli SL suffix, which is glossed as NOT-EXIST, can attach to adjectives and nouns and invariably gives an adjective as a result – from a semantic point of view, it essentially functions like the English suffix *-less*. Meir (2004) points out that the suffix has two allomorphs, a one-handed one that attaches to one-handed stems (e.g. INTERESTING), and a two-handed one that attaches to two-handed stems (e.g. IMPORTANT). It is the third example, SHAME^NOT-EXIST, which suggests that we

are indeed dealing with derivation, and not with inflection, as the suffix changes the word class.

INTERESTING^NOT-EXIST ('of no interest')	(Israeli SL, Meir 2004: 115)
IMPORTANT^NOT-EXIST ('of no import')	(Israeli SL, Meir 2004: 115)
SHAME^NOT-EXIST ('shameless')	(Israeli SL, Meir 2004: 115)

As before, the suffix can be traced back to an independent sign, the negative existential NOT-EXIST. Aronoff et al. point out that some of the suffixed words have an idiosyncratic meaning and that this type of "semantic drift" is characteristic of derivational affixes; they provide the example of SURPRISE^NOT-EXIST, which does not mean 'without surprise' but rather has a meaning closer to the English expression *big deal*. Still, the grammar writer should be cautious when discussing such cases, as change of word class, non-transparent semantics, and assimilation of handedness are also characteristic of compounds, as has been discussed in the previous chapter.

Some East Asian sign languages employ a "negative handshape" that is characterized by pinky extension and that may attach to lexical signs yielding a negative meaning. In HKSL, the  -hand means BAD/WRONG when used as a stand-alone sign. Some of the derivations involving this sign are transparent – e.g. LUCKY/LUCKY^BAD ('unlucky') – while others are less transparent or even opaque, e.g. MOUTH^BAD ('dumb') and EYE^BAD ('blind') (Tang (2006); also cf. Yang & Fischer (2002) for CSL). However, as in the NOT-EXIST case, the alleged suffix exists as a free element in the language, and the phenomenon might therefore be an instance of compounding rather than derivation.

It is important to note that combinations of a sign with a negative element are also discussed in the section "Verbal inflection" (section on Negation [Morphology – Section 3.5]). All of the cases discussed there involve predicates, for the most part, negative counterparts of modals and some other verbs. Just like distinguishing derivational negation from compounding, distinguishing derivational negation from inflectional negation may not always be straightforward. Clearly, when the word formation process has the potential of changing the word category (as is true for all of the processes discussed above), it cannot be inflectional. However, as pointed out previously, the opposite is not true, as derivational processes do not necessarily change the word category. In other words, the fact that the processes to be discussed under "Inflection" are non-category changing does not exclude the possibility that they are derivational.

2.1.1.3 Attenuative

"Attenuation" is a general term that refers to the reduction in the strength of a signal. In the realm of linguistics, the term "attenuative" is used for markers that make a concept more vague or less strong. In English, for instance, this meaning can be expressed by the affix *-ish*: something that is *blue-ish* is still blue but less clearly (or less prototypically) so. In Hebrew, the same meaning is expressed by partial

reduplication (e.g. *yerak~rak-im* – green~ATT-M.PL = 'greenish ones'). In the context of sign languages, this process is interesting, as it (i) may be marked sequentially or simultaneously (see below), and (ii) is in fact the only clear case of sequential derivation that we were able to identify.

The example comes from USL, where certain adjectives (most commonly color signs) can combine with a  -handshape, palm oriented outwards, and slightly shaking from left to right (Lutalo-Kiingi 2014). Crucially, the affix cannot occur by itself; that is, in contrast to the potential affixes discussed in the previous two sections, it is not grammaticalized from a free element. In addition to the affix, simultaneous non-manual marking is also involved, as tongue protrusion accompanies both the adjective and the affix.

2.1.2 Simultaneous derivation

Derivation may also be realized simultaneously (i.e. stem-modification). For the most part, the simultaneous derivational processes that have been identified to date involve characteristic movement [Phonology – Section 1.3] changes, sometimes in combination with reduplication, but other phonological parameters may also play a role. Again, we will only describe three types of processes that have been identified in previous research and encourage the grammar writer to look for other processes (which may not have been described yet for other sign languages; cf. also Padden & Perlmutter (1987) for the formation of characteristic adjectives in ASL).

2.1.2.1 Noun-verb pairs

A process that has been described for various sign languages is the derivation of action verbs from object nouns (Supalla & Newport (1978) for ASL; Johnston (2001) for Auslan; Hunger (2006) for ÖGS; Kimmelman (2009) for RSL). All studies identify characteristic movement changes, but the systematicity and frequency with which these processes apply seem to vary from sign language to sign language.

In their seminal study on ASL, Supalla & Newport (1978) found that generally, the verb in a pair has a single and more lax movement, while in the corresponding noun, the movement is shorter, restrained, and repeated. Among the examples they provide are the pairs SIT – CHAIR and PLANE – FLY-BY-PLANE; the former example is illustrated below. In other words: in these pairs, a stem-internal change (movement reduction) goes hand in hand with reduplication. All examples discussed by Supalla & Newport involve concrete object-denoting nouns, but recently, Abner (in press) added to the picture the fact that, at least in ASL, the process may also apply to verbs to yield abstract result-denoting nouns (e.g. ACCEPT – ACCEPTANCE, JOIN – PARTICIPATION).

 4_2.1.2.1_1_ASL_SIT  4_2.1.2.1_2_ASL_CHAIR

SIT CHAIR (ASL)

As for object nouns, Johnston (2001) made a similar observation for Auslan but points out that in this sign language, the clearest examples involve signs referring to actions that are inherently reversible. For instance, there are two verbs OPEN-DRAWER and SHUT-DRAWER with opposing movements, and in the corresponding noun DRAWER, the two movements are combined, resulting in repeated bi-directional movement.

Hunger (2006) identified 15 noun-verb pairs in ÖGS and measured their duration. She found that in general, the duration of verbs (in terms of number of frames) is twice as long as the duration of nouns – where longer duration can be the result of slower movement, larger movement, and/or reduplication. Interestingly, this pattern was also observed in verbs that are not inherently durational (e.g. LOCK).

Kimmelman (2009) describes various ways in which nouns and verbs in a pair may be formationally distinguished in RSL. His list of patterns contains movement changes (size or number of movements), overlapping with what has been described for ASL and Auslan, but also changes in orientation or handshape. However, he also notes a striking lack of systematicity across and even within signers (a point mentioned for many sign languages).

As mentioned previously, it will be up to the grammar writer to decide how to approach the issue of variation. One way to proceed might be to only include patterns that appear with some frequency/regularity (which obviously raises the question of how 'some' should be defined in this case). Another strategy would be to list all the observed patterns, no matter how frequently they appear in the data, and to also draw the reader's attention to the attested variation and the potential idiosyncracy of individual patterns.

2.1.2.2 Attenuative

We already introduced the attenuative in the context of sequential derivation. For ASL, Padden & Perlmutter (1987) discuss a semantically similar word formation process (first described by Bellugi (1980)) that is realized simultaneously, that is, by movement change and reduplication. While the basic adjectives may vary in movement, the attenuative forms all have repeated tense movement (trilled movement). Examples include QUIET – QUIETISH, BLUE – BLUISH, OLD – OLDISH.

2.2 Non-manual markers of derivation

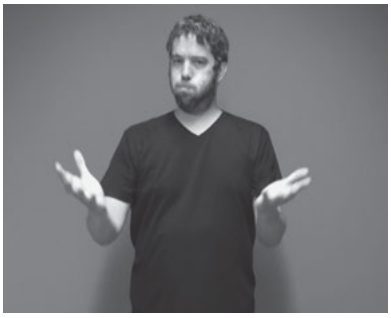
Non-manual markers that signal derivational processes generally involve the lower face, that is, the cheeks or the mouth (Wilbur 2000). As previously, the examples we discuss are non-exhaustive, but should inspire the grammar writer to look for

other derivational processes that are non-manually marked. It is important to note that certain adverbial meanings can also be expressed non-manually by lower face markers that accompany predicates; however, these will be treated in the section on adverbials [Lexicon – Section 3.5].

2.2.1 Diminutive and augmentative

Diminutive and augmentative markers simultaneously combine with nouns to yield the meaning 'small x' (diminutive) or 'big x' (augmentative); that is, they are not category-changing. Both markers involve (at least) specific configurations of the cheeks: sucked in cheeks (and pursed lips) for the diminutive, blown cheeks for the augmentative. In the literature, these non-manual morphemes are sometimes represented by the symbols ')(' for the diminutive and '( )' for the augmentative, and this is how we represent them in the following examples. The augmentative is illustrated by an image involving the DGS sign BALL.

)(
BALL ('small ball')



()
BALL ('big ball') (DGS)

While we focus on the cheeks in this example, the grammar writer should be aware that other non-manual markers might also play a role, for instance, eyebrow position. Moreover, it should be noted that the noun sign with which the non-manual combines may undergo additional manual changes; that is, it may be executed smaller or larger. If non-manual markers and manual modifications are systematically combined, then it is likely that we are dealing with an instance of extended exponence; that is, a case where two (or more) markers are combined to express a single meaning. Also, if these markers are attested in the sign language under study, it may be worth checking whether there are semantic and/or phonological constraints on their combination

with nouns, for instance, whether they can be combined with concrete and abstract nouns, nouns referring to inanimate and animate referents, and/or whether there are phonological constraints (such that e.g. the non-manual morpheme can only combine with nouns signed in neutral signing space). All potential constraints should be mentioned in the grammar.

Finally, when describing these processes, the grammar writer may wish to check whether manual adjectives like SMALL and BIG are generally accompanied by the same markers. If this is the case, then it might suggest that the respective non-manuals are lexically specified for these adjectives (see the section on phonological non-manuals [Phonology – Section 1.5]), but may function as morphemes when the manual part of the sign is dropped.

2.2.2 Intensive

Research has shown that in some sign languages adjectives may be modified for the intensive ('very x') by means of non-manual markers. For USL, for instance, Lutalo-Kiingi describes various markers, which may also combine. One of these markers is a squint ('sq'), which in example (a) combines with a mouth gesture glossed as '<o>'. Besides a squint, a brow raise ('br') may also fulfil an intensifying function, as shown in example (b). If the sign language to be described features some of these intensifying non-manual markers, then the grammar writer may also investigate whether they are in free variation, or whether certain markers co-occur with certain adjectives, that is, whether they constitute non-manual allomorphs.

a. EUROPE COLD
sq
<o>
'Europe is very cold.' (USL, Lutalo-Kiingi 2014: 80)

b. ENGLAND SNOW BEAUTIFUL
br
'In England, the snow is very beautiful.' (USL, Lutalo-Kiingi 2014: 81)

2.2.3 Proximity

For some sign languages, proximity can be marked by tongue protrusion; that is, the tip of the tongue is visible between the lips, often at the corner of the mouth (Lewin & Schembri 2011). The proximity that is expressed can be temporal or spatial. As for the former, the non-manual may, for instance, modify the sign BEFORE (which is signed on the time line [Morphology – Section 3.2.1] perpendicular to the body), yielding a

meaning like 'just a second ago', or the sign SOON to give the meaning 'very soon' (in this use, it is reminiscent of other intensive markers). As for the spatial meaning, tongue protrusion may combine with signs such as AROUND-THE-CORNER, adding the meaning of spatial proximity as in 'just around the corner'.

2.2.4 Noun-verb pairs: mouthings

The use of mouthings [Phonology – Section 1.5.2] as phonological (i.e. lexically specified) parts of signs has been introduced in the Phonology Part. Besides this use, it has been argued that in some sign languages, mouthings may distinguish nouns from verbs. A pattern that has commonly been described is that the noun of a noun-verb pair is accompanied by a mouthing while the verb is not (it, may, however, be accompanied by a mouth gesture [Phonology – Section 1.5.1]; see, for instance, Schermer (1990) and Bank (2014) for NGT, and articles in Boyes Braem & Sutton-Spence (2001) for various sign languages). For example, the noun BIKE would be accompanied by the mouthing /baik/ while the manually very similar (if not identical) verb BIKE is not. Yet, to date no sign language has been described that would systematically and consistently distinguish nouns from verbs by means of mouthings. Rather, what has been described is a tendency, and there is usually considerable variation across and even within signers.

Yet, if such a tendency is observed in the sign language, it might be worth mentioning the phenomenon in the grammar and provide some examples in which the tendency is particularly strong. After all, in these cases, the mouthing might constitute a simultaneous derivational marker the use of which is to some extent optional.

Elicitation materials

As for noun-verb pairs, various authors (ever since the seminal study of Supalla & Newport (1978)) have used pictures to elicit signs; for instance, one picture showing the object (e.g. a broom), the other showing a person using the object. Clearly, the use of static pictures has its limitations, since at times, the picture may be ambiguous. In addition, it may be difficult to isolate the verb from aspect, and isolate the noun from predication. A picture of a plane in the air, for instance, might elicit the noun AIRPLANE or THIS-IS-A-PLANE, and the corresponding verb might mean FLY-BY-PLANE or IS-FLYING-BY-PLANE. Still, the pairs (only glosses, no pictures) provided by Supalla & Newport in the Appendix to their article might be a good start.

Kimmelman (2009) used short video clips instead of pictures, and in the Appendix to his article, he also provides a list of the pairs used.

Other derivational markers, such as the agentive and the diminutive/augmentative may also be elicited by pictures (for instance, depicting professions or size contrasts), but for some, the use of picture stimuli may be less straightforward.

References

Main sources on derivation in sign languages:

Abner, N. In press. What you see is what you get.get: Surface transparency and ambiguity of nominalizing reduplication in American Sign Language. To appear in *Syntax*.

Aronoff, M., I. Meir & W. Sandler. 2005. The paradox of sign language morphology. *Language* 81(2), 301–344.

Bellugi, U. 1980. How signs express complex meanings. In C. Baker & R. Battison (eds.), *Sign language and the deaf community*, 53–74. Silver Spring, MD: NAD.

Boyes Braem, P. & R. Sutton-Spence (eds.). 2001. *The hands are the head of the mouth: The mouth as articulator in sign languages*. Hamburg: Signum.

Hunger, B. 2006. Noun/verb pairs in Austrian Sign Language (ÖGS). *Sign Language & Linguistics* 9 (1/2), 71–94.

Johnston, T. 2001. Nouns and verbs in Australian Sign Language: An open or shut case? *Journal of Deaf Studies and Deaf Education* 6(4), 235–257.

Kimmelman, V. 2009. Parts of speech in Russian Sign Language: the role of iconicity and economy. *Sign Language & Linguistics* 12(2), 161–186.

Lewin, D. & A. Schembri. 2011. Mouth gestures in British Sign Language: A case study of tongue protrusion in BSL narratives. *Sign Language & Linguistics* 14(1). 94–114.

Lutalo-Kiingi, S. 2014. *A descriptive grammar of morphosyntactic constructions in Ugandan Sign Language (UgSL)*. PhD dissertation, University of Central Lancashire.

Meir, I. 2004. Question and negation in Israeli Sign Language. *Sign Language & Linguistics* 7(2). 97–124.

Padden, C.A. & D.M. Perlmutter. 1987. American Sign Language and the architecture of phonological theory. *Natural Language and Linguistic Theory* 5. 335–375.

Quer, J. 2012. Negation. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 316–339. Berlin: De Gruyter Mouton.

Schwager, W. & U. Zeshan. 2010. Word classes in sign languages. Criteria and classifications. In U. Ansaldo, J. Don & R. Pfau (eds.), *Parts of speech: Empirical and theoretical advances*, 5–41. Amsterdam: John Benjamins. [previously published in *Studies in Language* 32(3), 2008].

Supalla, T. & E.L. Newport. 1978. How many seats in a chair? The derivation of nouns and verbs in American Sign Language. In P. Siple (ed.), *Understanding language through sign language research*, 91–132. New York: Academic Press.

Tang, G. (2006), Questions and negation in Hong Kong Sign Language. In U. Zeshan (ed.), *Interrogative and negative constructions in sign languages*, 198–224. Nijmegen: Ishara Press.

Yang, J.H. & S. Fischer. 2002. Expressing negation in Chinese Sign Language. *Sign Language & Linguistics* 5(2). 167–202.

General sources on derivation:

Schadeberg, T.C. 2003. Derivation. In D. Nurse & G. Philippson (eds.), *The Bantu languages*, 71–89. London: Routledge.

Spencer, A. 1991. *Morphological theory. An introduction to word structure in generative grammar*. Oxford: Blackwell.

Chapter 3 Verbal inflection

3.0 Definitions and challenges

3.0.1 What is inflection?

While compounding [Morphology – Chapter 1] and derivation [Morphology – Chapter 2] are usually considered lexical word formation processes, inflectional word formation is relevant to and dependent on syntax. Given this characteristic, it is also referred to as "morphosyntax": word formation in syntax. Furthermore, inflectional morphology is taken to realize (spell out) certain morphosyntactic features, the most common of which are person, number, tense, aspect, gender, and case. While the realization of some of these features clearly depends on the sentence context (e.g. the realization of person and number features on verbs), others are context-dependent in a broader (and more abstract) sense (e.g. tense inflection on verbs). Just like derivation, inflection usually involves the combination of a stem and an affix; yet, in contrast to derivation, it can never change the category of the stem (e.g. *paint* → *paint-ed*). Moreover, inflection is semantically regular.

For the sign language researcher, it may be a challenging task to disentangle which of the established morphosyntactic features are modality-independent, and also whether there are possibly features that are only relevant for either spoken or sign languages. There is, for instance, an ongoing debate about the role of the feature person in sign languages (Meier 1990; Liddell 2003; Lillo-Martin & Meier 2011), and there are proposals that sign languages employ modality-specific location (Zwitserlood & Van Gijn 2006) or identity (Costello 2015) features. It is important to note that the following explanations do not attempt to do justice to these complex controversies.

3.0.2 How is inflection marked?

Just like derivation, inflection is most commonly marked by affixation. Still, similar to derivation, other types of phono-morphological changes are attested. As these have already been addressed in the chapter on derivation [Morphology – Chapter 2], we will only briefly repeat the most important types here.

- *Stem modification*: A morphological process may be realized by a phonological modification of the stem rather than by the combination of morphemes. Various phonological processes occur in spoken languages: (i) change in a stem vowel, such as shortening, lengthening, umlaut, ablaut (e.g. English *sing* – *sang* – *sung*; German *Mutter* ('mother') – *Mütter* ('mother.PL')); (ii) change in a stem consonant, such as palatalization, nasalization; and (iii) tone change (i.e. a suprasegmental

change). A single inflectional process may be realized by affixation in combination with modification of the stem (e.g. German *Haus* ('house') – *Häuser* ('house.PL')).
- *Suppletion/base allomorphy*: These forms belong to the same lexeme but do not show any phonological similarity (e.g. English *go/went*, *be/was/am*; Turkish *var/yok* ('exist'/'exist.NEG')). In a sense, suppletion is the extreme case of stem modification; cases in which there is at least some phonological overlap are referred to as "partial suppletion" (e.g. English *are/were*).
- *Reduplication*: The inflectional process is realized by repeating (part of) a stem. In contrast to stem modification and suppletion, the process is sequential, but it does not involve an affix with a fixed form. In spoken languages, reduplication is commonly used to express plurality and certain types of aspect.
- *Conversion*: The inflectional process is not phonologically marked at all (also called "zero affixation"); e.g. German plural *Segel* ('sail') – *Segel* ('sail.PL').

3.0.3 Methodological challenges

In the previous chapters, we pointed out that the distinction of derivation and compounding may be challenging at times. The same is true for the distinction of inflectional from derivational processes. We already mentioned that negation, for instance, may be a derivational or inflectional process in sign languages. Obviously, if a process is capable of changing the category of a word, then we are dealing with derivation. Other methodological challenges that hold for inflection, just like for derivation, are: (i) the phonological change signaling an inflectional process may be very subtle; (ii) there may be variation across and within signers with respect to the application of a specific process; and (iii) certain inflectional categories may be zero-marked.

An additional challenge that is relevant to inflectional word formation is the distinction between affixation and cliticization. Given that both affixes and clitics are bound morphemes, the distinction between affixation and cliticization is one of the most problematic distinctions in morphology, and possibly even more so in sign language morphology. A coherent and systematic grouping of properties may be difficult, and the grammar writer should also note that a functional element may be a clitic in one language and an affix in another. Some researchers prefer to see the distinction as a cline, rather than a dichotomy. Nevertheless, in the table below, we list the most salient distinctions that have been proposed for spoken languages (Zwicky & Pullum 1983).

The criteria listed in the table have been set out to explain sequential morphology characteristic of spoken languages, and thus the task of deciding whether a sequentially expressed bound form is an affix or clitic may be rather straightforward. In sign languages, however, the task may be made more difficult by the fact that they have a tendency to employ simultaneous (in particular, non-manual) morphology. Still, the below criteria can be applied to sign languages, with small modifications necessitated by the visual channel.

Table Morphology-1: Criteria for distinguishing affixes from clitics in spoken languages (based on Zwicky & Pullum 1983)

Criterion	Affix	Clitic
Selection of stem	Selective in terms of the category of the stem (e.g. past tense *-ed* only selects verbs)	Less selective, can attach to stems of different categories (e.g. *-ve* (from *have*) can attach to pronouns and auxiliaries)
Irregularities	More likely to behave irregularly and idiosyncratically (e.g. *-ed* does not attach to all verbs)	Unlikely to behave irregularly and idiosyncratically
Semantic idiosyncracies	More characteristic of affixes (e.g. a particular affix might only be used with animate referents)	Unexpected
Attachment properties	Cannot attach to stems that contain clitics	Can attach to stems containing other clitics or affixes
Connection with free forms	Can usually not be traced back to free forms	Are more easily traced back to free forms, or have corresponding free forms (e.g. *have* → *-ve*)

When it comes to simultaneous non-manual morphology, the task starts with observing a bound form which is expressed non-manually, co-occurs with a manual sign, and is a morpho-syntactic category (e.g. negation, number). The table below illustrates how the distinguishing properties of affixes and clitics introduced in the previous table could be applied to such forms.

Table Morphology-2: Distinguishing properties of affixes and clitics applied to sign languages

Criterion	Applied to simultaneous non-manual morphology
Selection of stem	Does a non-manual marker X co-occur with the same category (expressed by a manual sign) each time it occurs, or with different syntactic categories? In the former case, it is likely to be an affix.
Irregularities	If a particular morpho-syntactic category (e.g. negation) is expressed by different forms X, Y, Z … (e.g. if it assimilates to its stem and has allomorphs), it is likely to be an affix.
Semantic idiosyncracies	If a non-manual marker X is only attested with a certain group of stems that share a semantic property, then X is likely to be an affix.
Attachment properties	This criterion may be difficult (if not impossible) to apply to simultaneously expressed bound forms, as it is difficult to determine whether a certain marker attaches before/after another one.
Connection with free forms	If a non-manual marker can occur independently (without accompanying a manual sign) and shares phonological features with its bound counterpart, then this non-manual marker is likely to be a clitic (caveat: across sign languages, it appears very uncommon for non-manual markers not to be co-articulated with a manual sign).

3.1 Agreement

3.1.0 Definitions and challenges

3.1.0.1 What is agreement?

Agreement or concord is a morphological phenomenon of dependency according to which part of the shape of a word depends on properties of other words to which it relates. Ultimately, this is the result of a process of feature sharing, whereby the shape of a word is modulated on the basis of some features of the word it depends on. As Steele (1978: 610) states in her often cited definition of agreement: "The term agreement commonly refers to some systematic covariance between a semantic or formal property of one element and a formal property of another."

In the clausal domain, the prototypical case of agreement in spoken languages is that between a verb and its subject. The example below illustrates the pattern of verb-subject agreement in the present tense of Italian.

Agreement pattern in Italian verbs (first conjugation present tense) (Italian)

a.	(io)	am-o	d.	(noi)	am-iamo
	(I)	love-1SG		(we)	love-1PL
b.	(tu)	am-i	e.	(voi)	am-ate
	(you)	love-2SG		(you)	love-2PL
c.	(egli)	am-a	f.	(essi)	amano
	(he)	love-3SG		(they)	love-3PL

The verb *amare* ('to love') agrees with its subject both in person and number features. Italian marks for a three-way (1, 2, 3) person distinction, a two-way (singular and plural) number distinction, and no particular syncretism is found in the present tense; therefore six different suffixes are found. In the literature, Italian-like systems, which mark every person-number distinction differently, are often referred to as "rich agreement" systems. Other systems mark fewer distinctions; English is an extreme case, as only a single person-number combination, third-person singular, is marked. Systems of this type are sometimes referred to as "poor agreement" systems. Finally, some languages do not mark agreement on verbs at all (e.g. Chinese), and these are commonly referred to as "null agreement" languages.

Another important typological observation is that in many languages, verb agreement is not confined to subject-verb agreement. Rather, verbs may also agree with an object (most commonly the direct object, but sometimes also other grammatical roles). This is illustrated by the examples below from Itelmen, a language spoken on the peninsula Kamchatka (Eastern Russia). In these examples, the verb *əlčqu* ('to see') agrees with its subject (by means of a prefix) and object (by means of a suffix). Generally, languages that display object agreement also display subject agreement, while, obviously, the reverse is not true.

a. t'-əlčqu-ɣin
1SG-see-2SG.OBJ
'I saw you.'

b. n-əlčqu-z-um
3PL-see-PRES-1SG.OBJ
'They see me.'
(Itelmen, Bobaljik & Wurmbrand 2002)

Besides the clausal domain, in many languages agreement is also attested within the nominal domain. In this case, agreement may be found between a noun and its modifiers, as in the following Italian examples, where the definite article and the adjective agree with the noun in gender and number features.

Agreement within the Italian noun phrase (Italian)

a.	il	ragazz-o	italian-o
	the.SG.M	kid-SG.M	Italian-SG.M
b.	le	ragazz-e	italian-e
	the.PL.F	kid-PL.F	Italian-PL.F

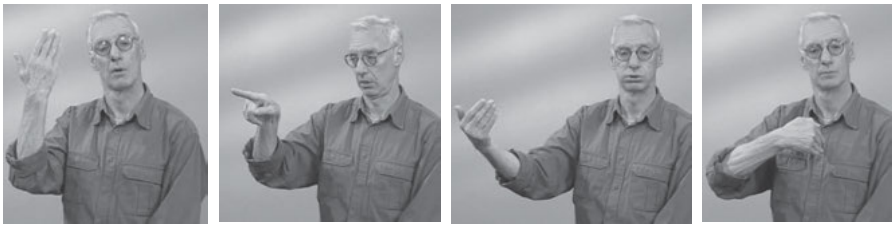
3.1.0.2 Terminology

Before turning to a general overview of how agreement may be marked in sign languages, it is important to point out that the issue of agreement is hotly debated in the field of sign language linguistics. Actually, even use of the term "agreement" is controversial. For instance, some scholars argue that the number of loci in signing space, which – as we shall see – are crucial for the realization of agreement, is infinite; in other words, the potential agreement markers cannot be listed in the lexicon. We shall not enter the theoretical debate (see Lillo-Martin & Meier (2011) and Mathur & Rathmann (2012) for recent overviews, and Wilbur (2013) for discussion), but we wish to stress that it is up to the grammar writer to decide what terminology s/he wants to use. For the sake of simplicity, we use the terms "agreement" and "agreement verb" in the following, but other terms that have been suggested in the literature are "directional verb" or "indicating verb" (Liddell 2000, 2003).

3.1.0.3 Marking agreement in sign languages

What makes agreement in sign languages typologically peculiar is the fact that only a subset of verbs can be modified in the way that we are going to describe in this section. Ever since the seminal work by Padden (1988), sign linguists generally distinguish three verb types: plain verbs, agreement verbs, and spatial verbs. Actually, it appears that across sign languages, most verbs have a fixed form and cannot be modified to mark agreement; these non-modifiable verbs are referred to as "plain verbs" [Lexicon – Section 3.2.1]. In contrast, agreement verbs and spatial verbs can be modified. On agreement verbs [Lexicon – Section 3.2.2], agreement is most commonly marked by a manual modification of the sign (be it a lexical verb or an agreement auxiliary

[Lexicon – Section 3.3.4]), typically a modification of the direction of movement and/or the orientation of the hand. Changes in the direction of movement result from the fact that the movement starts at the location associated with the subject and ends at the location associated with the object. Moreover, in certain verbs, the relevant part of the hand – the palm or the fingertips – are oriented towards the object. Verbs can agree with one or two arguments by (i) movement and orientation, (ii) movement only, or (iii) orientation only. Option (i) is illustrated by the following example from NGT. The third person referent BROTHER has previously been localized at location 3a. The verb VISIT then moves from this location towards the signer's chest (location 1); at the same time, the fingertips are oriented towards the signer.



EVENING INDEX$_{3a}$ $_{3a}$VISIT$_{1}$

'In the evening, he (my brother) will visit me.' (NGT, NGC 2002)

In addition to the manual realization of agreement, it has been argued for some sign languages (most notably ASL; see Bahan et al. 2000) that agreement can also be expressed non-manually by means of head tilt (towards the locus associated with the subject) and eye gaze (towards the locus associated with the object). This option is shown in the ASL example below, which involves the plain verb LOVE. According to the researchers, in this example, the head tilts slightly towards the locus associated with the subject (locus 'i'), while the eye gaze is oriented towards the locus associated with the object (locus 'j'). Note further that the authors claim that head tilt (marking subject agreement) starts slightly earlier than eye gaze (marking object agreement). Moreover, they note that non-manual agreement is also attested with intransitive verbs (e.g. JOHN BATHE); in this case, agreement may be realized by head tilt, eye gaze, or both.

head tilt$_{i}$
eye gaze$_{j}$
INDEX$_{i}$ LOVE MOTHER$_{j}$
'He/she loves mother.' (ASL, Bahan et al. 2000: 11, slightly adapted)

Finally, there is the group of spatial verbs [Lexicon – Section 3.2.3]. These verbs can be spatially modified, too, but the modification is not determined by the grammatical roles subject and object (i.e. by the loci of the subject/object arguments), but rather by locative arguments. Think, for instance, of examples like 'He put the glass on the table' or 'She moved the pen from the center to the side of the desk'. In the first case,

the end location of the signed verb would likely coincide with the goal location; in the latter case, the beginning and end locations would coincide with the source and the goal location, respectively. While both these examples involve transfer of an object, spatial verbs can also express static location, as in 'The book lies on the table'. Note that in most sign languages studied to date, spatial verbs commonly involve classifier [Morphology – Section 5.1] / classifier handshapes that reflect shape properties of the manipulated or located object.

3.1.0.4 Methodological challenges

There are various factors that may make the identification of agreement verbs in a sign language difficult. First of all, there is the issue of optionality. A verb that may potentially agree with its subject and object may lack either one or even both of the agreement markers (i.e. the specification(s) for the respective locus/loci). If only one of the markers is missing, then this is typically the subject marker. That is, in the sentence 'You visit him', movement of the NGT verb VISIT illustrated above might start in front of the signer's chest (beginning point of the citation form) and move towards the location associated with the object. Moreover, corpus studies have revealed that occasionally, an agreement verb may appear entirely uninflected, that is, in its citation form (e.g. De Beuzeville et al. (2009) for Auslan). Clearly, this is different from spoken languages where omission of the correct agreement morphology would usually result in ungrammaticality.

Second, there may be verb-specific gaps in the agreement paradigm. Certain verbs may only show agreement for certain subject-object combinations, possibly due to articulatory factors. For instance, depending on the orientation of the hand, it may be difficult for a sign to move from the contralateral towards the ipsilateral side of the signing space, simply because it involves an awkward bending of the wrist. In such a case, the subject marker on the verb may be omitted in the way sketched in the previous paragraph (Costello 2015).

A special case are verbs that involve a movement from a body part, such as the verb SAY in many sign languages, which has a beginning point close to the signer's mouth. Often, such a specification for a body part may not be changed, which again results in the fact that such verbs can only show object agreement. Some researchers have argued that in these verbs, the body represents the subject (Meir et al. 2007).

Taken together, the challenge for the grammar writer is that s/he will have to identify possible agreement gaps and omissions in order to come to an understanding of the agreement system of the sign language under investigation.

3.1.1 Person and locative markers

In the section on verbs [Lexicon – Section 3.2] in the Lexicon Part, the grammar writer will address the existence of different verb types in the sign language (possibly

with verb lists). In the present section, the grammar writer should focus on describing how agreement is marked on various types of verbs in the sign language under investigation, that is, how it is phonologically realized. Below, we suggest addressing subject, object, and locative markers separately, as this structure mirrors how different paradigms would likely be presented in a spoken language grammar. Remember from the introduction that subject and object markers characterize agreement verbs while locative markers characterize spatial verbs. However, the grammar writer may decide to proceed in a different way, given the modality-specific property that most of the agreement markers in sign languages do not have a fixed phonological form that could be listed in a way like the Italian markers we presented at the beginning of this section.

Researchers have observed that the only person that has a fixed form, and displays some sign language-specific properties, is the first person. Some scholars therefore suggest that sign languages do not distinguish between first, second, and third person, but rather between first and non-first person (Meier 1990). The grammar writer might therefore decide to include subsections on "first person markers" and "non-first person markers" instead of "subject markers" and "object markers", or even to present the patterns without internal structure. Also, if non-manual markers turn out to play a systematic role in agreement marking, the grammar writer may wish to introduce headers for "manual" and "non-manual markers". Also, the writer should investigate in this context whether there are semantic constraints on what types of arguments agreement verbs can agree with. For some sign languages, it has been observed that agreement is restricted to [+human] arguments – this possibility should be investigated for subject and object markers.

Finally, recent studies suggest that the distinction between agreement verbs and spatial verbs should be abandoned, as agreement with person or locative features is often indistinguishable at the surface (de Quadros & Quer 2008). Also, one and the same verb may sometimes behave as an agreement verb but at other times like a spatial verb (e.g. BRING). To some extent, it is thus up to the grammar writer to decide how to internally organize this section.

3.1.1.1 Subject markers

In this section, the grammar writer should describe how subject agreement is marked in the language – either distinguishing three persons or following the first versus non-first distinction. It may make sense to distinguish transitive verbs from intransitive verbs in this section. As transitive agreement verbs are generally considered the prototypical manifestation of agreement verbs, we will consider them first.

Generally, for transitive agreement verbs that involve path movement [Phonology – Section 1.3.1] / path movement, the subject marker will be the beginning of the movement, or, to put it differently, the first location slot in a location-movement-location sequence. The grammar writer should describe which loci can be used for first,

second, and third person in transitive verbs. For first person, this will likely be a location close to or on the signer's body – as mentioned before, this will probably be the only person form that can be assigned a fixed phonological form. Still, distinctions on the vertical axis may be of importance, as some verbs begin their path movement in their citation form in front of the chest (e.g. GIVE) while others begin in front of the mouth/chin (e.g. ASK) or eyes (e.g. SEE). Less can be said about second and third person, as these can be marked by every locus in signing space. Second person will be a location close to the addressee, but obviously, the position of the addressee in a discourse setting is not fixed, and consequently, the second person subject marker does not have a fixed form either. The same holds for the third person subject marker, which will be a position close to a present third person referent, or an arbitrary position created for a non-present referent. Still, it might, for instance, turn out that non-present third person subjects are always marked by a locus at the ipsilateral side of the signing space – and if this is the case, it should also be described.

Possible gaps that result from the phonological specification of verb signs can also be addressed in this section. As mentioned previously, such gaps may occur when a sign is specified for a beginning point on or close to the signer's body, since in this case, non-first subject agreement may be blocked. In such cases, it may be particularly interesting to investigate whether the sign language has developed a strategy to still mark a non-first subject with such verbs, as has been described for LSE, for instance (Costello 2015). In LSE, a verb that is lexically specified for an initial location on the body (e.g. WARN) is capable of expressing subject agreement in a sentence like 'She warns you' by moving from the specified location on the body towards the locus associated with the subject and then towards the addressee locus.

In addition, gaps may result from articulatory constraints. For instance, depending on the orientation of the fingers or palm, moving the hand from the contralateral to the ipsilateral side of the signing space may require an awkward bending at the wrist. It appears that sign languages employ different strategies to avoid such a situation. While ASL would simply drop subject agreement in this case, NGT would more likely resort to using the non-dominant hand instead (a so-called "dominance reversal").

Moreover, if a non-manual marker is found to be relevant (e.g. head tilt towards subject locus), it should also be described. For obvious reasons, head tilt is unlikely to mark first person agreement, and gaps like these should be made explicit. The grammar writer should keep in mind that it is possible that verbs that cannot agree manually (i.e. verbs that would usually be considered plain verbs) do show non-manual subject agreement. Alternatively, it might be the case that non-manual agreement is only observed with verbs that also agree manually (see also below [Morphology – Section 3.1.1.2] for object markers).

A well-known complication concerning transitive agreement verbs are the so-called "backwards verbs". In these verbs, the mapping of subject and object onto the beginning and end point of the path movement is reversed, that is, the subject

marker occupies the final location slot in a location-movement-location sequence. In many sign languages, this is true, for instance, for verbs like INVITE and TAKE-FROM. That is, in a sentence like 'I invite you', the movement would start at the location of the addressee and end close to the signer's chest. Some scholars have therefore argued that movement in agreement verbs does not actually proceed from subject to object but from Source to Goal (Meir 2002) – if, for instance, I invite someone, then the invitee is the source of the action and I am the goal. Given that the group of backwards verbs is usually small in a sign language, the grammar writer could either list the relevant verbs here or refer back to the section on agreement verbs [Lexicon – Section 3.2.2] in the Lexicon Part.

As pointed out previously, when sign language linguists talk about agreement verbs, they usually mean transitive (and ditransitive) verbs. However, intransitive verbs may also show subject agreement, and once again, this may be realized manually or non-manually. Costello (2015: 127) refers to this type of agreement as "single argument agreement" and specifies that "in single argument agreement the verb is not directional but localizable: the verb is articulated at the locus associated with the argument. As such, the spatial mechanism employed by the verb only ever allows for one argument to be marked, and only a single agreement slot exists". That is, in these cases, the locus itself is the agreement marker, not the beginning point of the movement, as is illustrated by the following LSE example. In this example, the (reduplicated) sign DIE is articulated at the locus that has been established for SHEEP. Note that Costello also points out that first person agreement is barred in single argument agreement, probably for articulatory reasons.

INDEX$_x$ SHEEP ALL$_x$ DIE++$_x$
'The sheep all died.' (LSE, Costello 2015: 186)

3.1.1.2 Object markers

As for agreement by path movement, not much has to be added with respect to object markers. Except for backwards verbs, the object marker will be the end point of the movement, and as before, only the first person object marker has a fixed form (i.e. a location close to or on the signer's body). However, what should also be addressed in this section is the fact that orientation can also mark object agreement in some verbs (as was shown above for the NGT verb VISIT), and is actually the only marker of agreement in other verbs, namely verbs that do not have path movement but can express agreement by means of the orientation of the palm or the fingertips.

Similarly to what we described for subject markers, the possibility of non-manual agreement should be explored. Remember that for ASL, researchers have claimed that object agreement can be marked non-manually by means of eye gaze. However, there is an interesting controversy: While Bahan et al. (2000) claim that eye gaze agreement can occur with all verbs – no matter whether they agree manually or not

– Thompson et al. (2006) found in an eye-tracking study that eye gaze agreement only occurs with verbs that also agree manually. They therefore describe the combination of manual and non-manual object marking as a circumfix. Investigating the different possibilities for the sign language under investigation is certainly worthwhile.

Finally, single argument agreement, as defined in the previous section, can also apply to an object argument. Actually, the LSE example we presented a few lines up continues with the clause in (a), in which the (reduplicated) verb DEVOUR is articulated at the same locus as the verb DIE.

a. WOLF DEVOUR++$_x$
'The wolf devoured them.' (LSE, Costello 2015: 186)

b. WOMAN WANT$_x$ WANT$_y$ WANT$_z$
'The women$_{i,j,k}$ are each wanting.'
'The woman wants this$_i$, and this$_j$, and this$_k$.' (ASL, Padden 1990: 121)

Padden (1990) provides the interesting ASL example in (b), in which the verb WANT is realized at three distinct loci in the signing space. This example also exemplifies single argument agreement, but it is ambiguous between subject and object agreement, as the translations indicate. If such ambiguities exist in the sign language that is described, they should certainly be pointed out.

3.1.1.3 Locative markers

Just like subject and object markers on agreement verbs, locative markers on spatial verbs can be realized by the beginning and end point of a path movement. If both are relevant for a verb, then the beginning point will usually coincide with the Source location and the end point with the Goal location, for example, 'She moved the book from the left side to the right side of the shelf' or 'The boy walked from the school to the house'. Occasionally, only one of the location slots may be relevant, for example, 'He put the glass on the table' (only Goal location relevant) or 'I took the book from the shelf' (only Source location relevant).

While the previous examples involve transfer of an object/entity from and/or towards a location, locative markers are also attested on verbs that express a static location. Such verbs (sometimes glossed as BE-LOCATED) usually combine a location, a short movement towards this location (which is semantically empty but is required for phonetic reasons), and a classifier [Morphology – Section 5.1] / classifier handshape (Pfau & Aboh 2012). Note that the orientation of the hand may also contribute meaning, for example, 'The boy is standing on the bed' versus 'The boy is lying on the bed'. However, in the present section, only the realization of locative markers should be described. As in principle every location in the signing space or on the body can be a locative marker, it will probably suffice to point out that such markers exist in the language and provide a couple of examples that illustrate the use of such markers

on different types of verbs. In addition, it could be discussed whether (and illustrated how) two entities can be simultaneously localized by means of the two hands. If one hand serves as the Ground (e.g. a flat hand representing a surface in a sentence like 'The cup is on the table'), then only the moving hand realizes a predicate that carries a locative marker. However, occasionally both hands represent entities that are located with respect to each other (e.g. a car and a bike next to each other), and in this case, when there is no clear Figure-Ground-relationship, it can be argued that both hands carry a locative marker.

There is one sign language-specific complication concerning the description of locative markers. Some sign languages have been shown to not employ abstract loci that are introduced for non-present referents (e.g. by means of pointing signs), but to only make use of absolute (real-world) locations. In such a sign language, it would be impossible to point towards an empty locus in the signing space to refer to a non-present referent; yet a signer could point, for example, towards the house in which this referent is living. In some sign languages that employ absolute locations, verbs can never be spatially modified to agree with these locations (see de Vos (2012) for Kata Kolok, a village sign language of Bali); if this is the case, then the language does not employ subject, object, or locative markers on verbs, and the present section would thus be empty. However, in other sign languages, verbs can be modified, but only to target absolute locations (see Bauer (2014) for Yolngu SL). In this case, all agreement markers on verbs can in principle be interpreted as locative markers, and it is up to the grammar writer to decide where to discuss these modifications. Finally, at least Inuit SL has been shown to allow for both abstract and absolute locations on verbs (Schuit 2013), and in this case, it would probably make sense to discuss the markers under subject/object markers and locative markers, respectively.

3.1.2 Number markers

Across spoken languages, the most common number distinction found on verbs is the distinction between singular and plural (as in the Italian examples at the outset of this section [Morphology – Section 3.1.0.1]). However, languages may allow for more fine-grained distinctions, and this also seems to hold for many sign languages. A four-way distinction that is often mentioned in the literature is the one between the singular, dual, multiple, and exhaustive form (Klima & Bellugi 1979; Steinbach 2012). As in most spoken languages, the singular remains unmarked, and it may therefore be unnecessary to discuss this feature. Generally, only verbs that allow for the types of spatial modification discussed in the previous section allow for number inflection, but if the grammar writer comes across exceptions to this generalization, this should be mentioned.

3.1.2.1 Dual

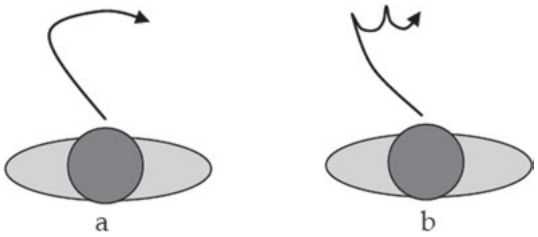
The dual signals that two entities are involved. In sign languages, this may be expressed in two ways. Either the verb is repeated once, or – in the case of one-handed signs – the non-dominant hand is added. Consider, for instance, the realization of a sentence like 'I give an object to the two of you'. There are actually three options to realize the dual in this case: (i) the sign GIVE moves first from a location in front of the signer's body towards addressee 1 and then from the same beginning location towards addressee 2; (ii) the dominant hand moves from a location in front of the signer's body towards addressee 1 while the non-dominant hand simultaneously moves from the same beginning location towards addressee 2; or (iii) the dominant hand moves from a location in front of the signer's body towards addressee 1, and subsequently the non-dominant hand moves from the same beginning location towards addressee 2. It is very likely that for two-handed verbs, only option (i) will be available. The grammar writer is encouraged to investigate which realizations are attested and also whether they possibly go hand in hand with slightly different meanings (which, however, may go beyond agreement marking proper).

3.1.2.2 Multiple

The form that is referred to as "multiple" (or "collective") comes close to what one would usually call a "plural". It is generally realized as an arc movement. Using again the verb GIVE as illustration, a sentence like 'I give an object to them' would be realized by moving the verb from a location in front of the signer's body in a straight line towards a location on the contralateral side of the signing space and then in an arc towards a location on the ipsilateral side of the signing space (in continuous signing, the straight and the arc movement are likely fused into one continuous movement).

3.1.2.3 Exhaustive

Finally, researchers have described a number value that is referred to as "exhaustive" or "distributive". This form also expresses a plural meaning, but it individuates members of a set; for the verb GIVE, this could be translated as 'I give to each of them'. Again, the verb would start at a location close to the signer's body and move towards a location on the contralateral side of the signing space. But subsequently, while moving towards the ipsilateral side, the forward movement of the base form is reduplicated (although the reduplicants are likely to have a reduced movement). See the figure below for schematic representations of the multiple (a) and the exhaustive (b) form (Costello 2015: 183). Note that with one-handed verbs, the exhaustive may also involve the addition of the non-dominant hand; the hands are then likely to move in alternation.



The multiple (a) and exhaustive (b) plural number forms in LSE. (LSE)

Table Morphology-3: The potential full paradigm of verbal inflection for person and number in LSE. The table shows the various possible combinations of verbal inflection for first/non-first person and singular/plural categories for typical agreeing verbs. Where both subject and object are non-first person, they are not co-referential. 1P = first person; XP = non-first person; SG = singular; PL = plural (multiple)

			OBJECT			
			1P		XP	
			SG	PL	SG	PL
SUBJECT	1P	SG			1	2
		PL			3	4
	XP	SG	5	6	7	8
		PL	9	10	11	12

Table Morphology-4: The attested paradigm for prototypical agreeing verbs in LSE (grey = not attested)

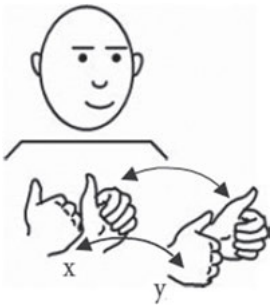
			OBJECT			
			1P		XP	
			SG	PL	SG	PL
SUBJECT	1P	SG			✓	✓
		PL			×	×
	XP	SG	✓	✓	✓	✓
		PL	✓	✓	×	×

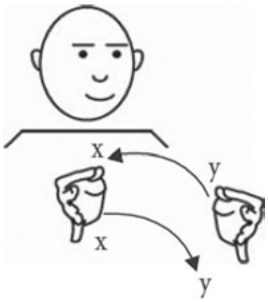
For all forms, the grammar writer should investigate whether they can mark subject and object number. All of the examples discussed in the preceding text involve a first person singular subject and a non-singular object, but obviously, the subject may also be specified for number (e.g. 'The two of us give to him', 'They give to me', etc.). What complicates matters is that phonetic/articulatory factors may cause agreement gaps, that is, not all possible person-number combinations may be attested; see Mathur & Rathmann (2001) for ASL, where first person plural object forms (e.g. 'give us') are blocked. The grammar writer could even include a separate section in which possible person-number combinations (for subject and object marking) are inventoried. Above, we include two tables from Costello (2015: 207f)) that illustrate a possible procedure. The first table presents the potential full paradigm for first/non-first person categories in LSE (looking only at combinations of the singular and the multiple) and sketches by means of arrows what they would look like (when both the subject and the object are non-first person, they are not co-referential). The second table shows which combinations are actually attested in LSE (the 'x' in the shaded cells indicating the combinations that are blocked).

3.1.3 Reciprocal markers

If the sign language has a reciprocal pronoun, this pronoun will have been introduced in the Lexicon Part, in the section on reflexive and reciprocal pronouns [Lexicon – Section 3.7.4]. Besides this, however, it is possible that reciprocity can also be marked on verbs, similar to what has been found for many spoken languages (e.g. Turkish). At least in some sign languages, various verbal strategies exist, and the choice of strategy has been shown to depend (i) on the verb class and (ii) on phonological factors. If this turns out to be the case in the sign language under investigation, the strategies should be described.

For the sake of illustration, consider the DGS patterns (Pfau & Steinbach 2003). In DGS, the first crucial distinction is the one between plain verbs and agreement verbs. With all plain verbs, the reciprocal meaning ('to x each other') is realized by zero marking, that is, the object slot of a transitive verb is empty (e.g. WE-TWO HATE is interpreted as 'We two hate each other'; cf. English *They kissed*). In contrast, in agreement verbs, the movement of the verb can be reversed to express the reciprocal meaning (Pfau & Steinbach refer to this strategy as "backward reduplication"); that is, the verb moves in one uninterrupted movement contour from the subject to the object locus and then back to the subject locus. Furthermore, phonological factors come into play, namely the distinction between one-handed and two-handed verbs. While the backward reduplication is realized sequentially with two-handed agreement verbs, it can be realized simultaneously with one-handed agreement verbs, i.e. one hand moves from the subject to the object locus while the other hand simultaneously performs the reverse movement from object to subject locus. The two options are illustrated in the figure below for the two-handed verb HELP (a) and the one-handed verb GIVE. In the left figure, both hands move in parallel from locus x to locus y and then back to x.





a. $\text{HELP}_{x\rightarrow y\rightarrow x}$
'help each other'

b. $\text{GIVE}_{x\rightarrow y/y\rightarrow x}$
'give to each other'

(DGS, Pfau & Steinbach 2003: 13, 18)

Obviously, other sign languages may behave differently in this respect. For instance, it may be the case that reciprocity is never marked on the lexical verb, but rather by means of agreement auxiliaries [Lexicon – Section 3.3.4], pointing signs, or bi-clausal structures. Of these, only the first can be considered an instance of verbal inflection. If no inflectional strategy is attested, this section will be empty or will contain brief mention of the fact that reciprocity is realized by non-inflectional strategies in the sign language.

Elicitation materials

In previous studies, the availability of spatially modifiable verbs (agreement verbs and spatial verbs) has often been tested by means of short video clips or pictures in which participants interact with each other (e.g. a woman giving an object to a man) or objects are manipulated or located in space (note that similar materials have been used to elicit classifier handshapes). Obviously, it is easier to depict actions expressing concrete transfer (like giving/taking, possibly also visiting) in such clips than actions involving abstract transfer (like helping, asking, trusting). A possible way to overcome this problem might be to combine a picture with a written verb (in its base form); e.g. the picture could show a child who fell and a man approaching it, combined with the verb stem "help". As for additional animated video clips, De Vos (2012) used, for instance, *Canary Row* clips (better known as "Tweety and Sylvester cartoon") as well as cartoons from the German television show *Die Sendung mit der Maus*, in which a mouse and an elephant (that is smaller than the mouse) interact. In addition, Costello (2015) had signers retell Aesop fables (that have also been used in the ECHO sign language corpus project). An obvious shortcoming of this data type is that it is based on written language. A way to mitigate the influence of the written language is to provide the fables beforehand and then not having them available during

the recording session; that is, the signers have to retell the content from memory. For reciprocal constructions, the stimulus set developed by Evans et al. (2004) can be used.

Elicited data can be supplemented by spontaneous conversations on a range of topics and by controlled interviews. As for the former, corpus data have been found to offer important insights. However, it has to be pointed out that verbs that can in principle be spatially modified are not always modified in spontaneous data (e.g. De Beuzeville et al. (2009) for Auslan). Consequently, based on corpus data, the size of the set of agreement/directional verbs may be underestimated. Controlled interviews provide an opportunity to explicitly target the structures that the researcher is interested in. Also, grammaticality judgements may turn out to be informative, for instance, when attempting to identify gaps in the agreement paradigm. In this case, signers would be presented with a pre-recorded inflected version of a verb (in a sentence context) and would have to indicate whether the specific form is acceptable.

References

Main sources on agreement in sign languages:

Bahan, B., J. Kegl, R.G. Lee, D. MacLaughlin & C. Neidle. 2000. The licensing of null arguments in American Sign Language. *Linguistic Inquiry* 31(1). 1–27.

Costello, Brendan. 2015. *Language and modality: Effects of the use of space in the agreement system of lengua de signos española (Spanish Sign Language)*. University of Amsterdam & University of the Basque Country PhD dissertation.

Janis, W.D. 1995. A crosslinguistic perspective on ASL verb agreement. In K. Emmorey & J. Reilly (eds.), *Language, gesture, and space*, 195–223. Hillsdale: Erlbaum.

Liddell, S.K. 2000. Indicating verbs and pronouns: Pointing away from agreement. In K. Emmorey & H. Lane (eds.), *The signs of language revisited: An anthology to honor Ursula Bellugi and Edward Klima*, 303–320. Mahwah, NJ: Erlbaum.

Liddell, S.K. 2003. *Grammar, gesture, and meaning in American Sign Language*. Cambridge, UK: Cambridge University Press.

Lillo-Martin, D. & R.P. Meier. 2011. On the linguistic status of 'agreement' in sign languages. *Theoretical Linguistics* 37(3/4). 95–141.

Mathur, G. & C. Rathmann. 2012. Verb agreement. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 136–157. Berlin: De Gruyter Mouton.

Meir, I. 2002. A cross-modality perspective on verb agreement. *Natural Language & Linguistic Theory* 20. 413–450.

Meir, I., C.A. Padden, M. Aronoff & W. Sandler. 2007. Body as subject. *Journal of Linguistics* 43. 531–563.

Padden, C.A. 1988 [1983]. *Interaction of morphology and syntax in American Sign Language* (Outstanding Dissertations in Linguistics, series IV). New York: Garland Press.

Wilbur, R.B. 2013. The point of agreement: Changing how we think about sign language, gesture, and agreement. *Sign Language & Linguistics* 16(2). 221–258.

General sources on agreement:

Corbett, G.G. 2006. *Agreement*. Cambridge, UK: Cambridge University Press.

3.2 Tense

3.2.0 Definitions and challenges

3.2.0.1 What is tense?

Time indication is one of the features that makes languages unique as a communication system, as it allows users to talk about people, things, or events that are not immediately visible or presently occurring (see also the chapter on tense in the Semantics Part [Semantics – Chapter 1]).

In terms of grammar, tense is "a coding convention that indicates the temporal relation between speech time and reference time" (Klein 1994). Theoretically, time in language can be divided into *situation-external time*, marked by tense, and *situation-internal time*, marked by aspect [Morphology – Section 3.3]. Tense, in turn, is divided into three broad categories, that is, present tense ('They enjoy this book'), past tense ('They enjoyed this book'), and future tense ('They will enjoy this book'). In practice, however, temporal and aspectual meanings in a given language may often overlap (Bybee, Perkins & Pagliuca 1994; Dahl 1985; Klein 1994). For example, in an English sentence such as 'He walked', the verb is in simple past tense, as indicated by the suffix *-ed*, and no aspectual information is provided. In contrast, in the sentence 'He was walking', temporal reference is past, as indicated by the past tense auxiliary *was*, but in addition, the suffix *-ing* provides aspectual information, namely continuous or progressive aspect. As for the typology of tense marking, it is worth noting that languages may make more fine-grained tense distinctions, distinguishing, for instance, immediate past and remote past by means of dedicated morphemes.

Defined above as situation-external, tense places a situation, event, or action at a point in time with reference to the moment of speaking. Tense is a deictic category and takes scope over the whole proposition (Chomsky 1968). Across spoken languages, tense is commonly expressed by bound or free time indicator morphemes, such as the English suffix *-ed* to indicate past tense or the adverbial *tomorrow* to indicate future tense (as in *Tomorrow I have a meeting*, where future tense is only marked by the adverbial). In this section of the grammar, only bound tense morphemes will be considered, while time adverbials will be addressed under parts-of-speech in the section on sentence adverbials [Lexicon – Section 3.5.2]. In addition, the section on tense inflection also includes a discussion of time lines, as these are clearly related to tense marking.

3.2.0.2 Methodological challenges

Just as in many spoken languages, in most sign languages studied to date, tense is not marked on the verb at all (Cogen 1977; Sandler & Lillo-Martin 2006), but rather by other means, most importantly, time adverbials and tense markers [Lexicon – Section 3.3.1]. Still, given that potential tense inflection has been described for at least two

sign languages (ASL and LIS), we encourage the grammar writer to look for – possibly subtle – manual and non-manual markers systematically accompanying verbs. Yet, it might well turn out that no tense inflection is attested in the sign language under investigation.

In addition, as mentioned previously, it is not always easy to tease apart tense and aspectual marking. For ASL, for instance, it has been observed that a head nod may mark perfect tense (Grose 2003), but perfect is usually considered a type of aspect. Clearly, attributing a grammatical meaning to a particular marker may pose a methodological challenge.

3.2.1 Time lines

In many cultures around the world, the concept of time is mapped metaphorically on the concept of space, and this conceptual mapping is reflected in language (Lakoff & Johnson 1980). Time may, for instance, be metaphorically perceived as a line, such that the past is perceived as behind the speaker's body (consider, for example, English phrases such as 'Let's leave the past behind' or 'This happened back in the fifties'), whereas the future is conceptualized as lying ahead of the speaker (as in 'I am looking forward to the party' or 'We don't know what lies ahead') – this mapping is attested in most European cultures and many other cultures from around the world. However, it is not the only option. In other cultures, such as various Native American cultures, exactly the opposite mapping is employed: events from the past are perceived as known/visible, and are thus conceptualized as lying in front of the speaker, while future events are perceived as unknown/invisible, and are therefore conceptualized at a position behind the speaker.

Basically all sign languages researched to date are reported to make use of "time lines" and generally, these time lines reflect the ones that are used in the broader culture. Time lines are visually realized in the signing space and serve as a time-indicating grammatical mechanism. Time lines, or more specifically, positions on time lines, will be treated here as abstract morphemes that can combine with other categories: verbs, but also time adverbials and other tense markers. These positions indicate reference time in relation to the signer's body, or to a position just in front of the signer's body.

The time line most commonly used across sign languages runs along the horizontal plane from a point in front of the signer to a point behind the signer, with the present moment corresponding to a point at the signer's chest. Hence, moving from the back to the front of the signer, we can locate far past, past, near past, present, near future, future, and far future, respectively. It is important to note that fine-grained distinctions on the time line may play a role in the expression of time adverbials, but are unlikely to be marked as inflectional categories on verbs, where only broad distinctions may be marked (see next section [Morphology – Section 3.2.2]), if any.

The use of time lines has been investigated in detail for BSL (Brennan 1983), NGT (Schermer & Koolhof 1990), LSA (Massone 1994), and LSFB (Sinte 2013), and it has been found that in some sign languages, other time lines besides the one described above are available. For instance, a time line may be located in front of the body, either horizontally (e.g. to express duration in time or a sequence of days) or vertically (e.g. to express growth); see, for instance, Schermer & Koolhof (1990) and Massone (1994) for illustration and discussion of such alternative time lines.

The grammar writer should identify any time lines available in the sign language and describe how they are used (for instance, for which semantic domain). It might, however, turn out that the sign language does not possess any time-line mechanism – as has been reported, for instance, for Kata Kolok, a village sign language from Bali (Marsaja 2008).

3.2.2 Tense inflection

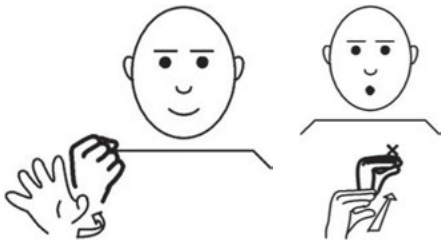
To date, tense inflection on the verb has only been reported for two sign languages, ASL (Jacobowitz & Stokoe 1988) and LIS (Zucchi 2009). However, it might well be the case that tense inflection is more common across sign languages, but has been overlooked because it involves very subtle phonological changes.

Jacobowitz & Stokoe (1988) claim that in some ASL verbs, tense may be marked by a manual change involving extension or flexion of one or more joints. Specifically, "extension (of the hand) at the wrist, (of the forearm) at the elbow, or (of the upper arm) at the shoulder", or a combination thereof, will denote future tense, while "flexion at the wrist, elbow, or shoulder with no other change in the performance of an ASL verb" will denote past tense (Jacobowitz & Stokoe 1988: 337). They argue that these changes, which result in a slight displacement on the vertical plane (extension of joints: upward; flexion of joints: downward), are systematically observed in about two dozen ASL verbs (e.g. COME and GO).

Zucchi (2009) observes a systematic non-manual change in LIS verbs. The relevant non-manual marker is shoulder position: if shoulders are tilted backward, then the action took place before the time of utterance (past tense); if shoulders are straight, then the clause receives a present tense interpretation; and if shoulders are tilted forward, then the action is assumed to take place after the time of utterance (future tense). Clearly, this non-manual change can be related to the time line described in the previous section. Zucchi further observes that non-manual tense inflection is absent in sentences containing past or future time adverbs, a pattern that is clearly different from the one attested in Italian and English. In fact, the co-occurrence of a time adverb and non-manual inflection within a clause leads to ungrammaticality.

Finally, in this section, the grammar writer should also list and describe exceptional (suppletive) forms, if they exist. Sutton-Spence & Woll (1999) point out that in some BSL dialects, certain verbs differ depending on whether they are used in a past

or present tense context. To give one example: the sign WIN is articulated on the ipsilateral side of the signing space, and involves a handshape change from an open hand to a fist combined with an underarm rotation, while in the sign WON, a flat handshape (in which the fingers contact the thumb) makes contact with the contralateral side of the chest; see the figures below – that is, there is no phonological overlap between the two forms (comparable to English *go – went*).



WIN WON

(BSL, based on Sutton-Spence & Woll 1999: 116)

In NGT, the past tense form of the verb HAPPEN shares with the present tense form place of articulation (neutral signing space) and handshape (two  -hands) but differs in movement: in the present tense form, the circular movement executed by both hands is forward, in the past tense form backward (i.e. towards the signer's body). In a sense, the directionality is consistent with the timeline, but a similar change is not found in any other NGT verb.

References

Main sources on tense in sign languages:

Brennan, M. 1983. Marking time in British Sign Language. In J. Kyle & B. Woll (eds.), *Language in sign,* 10–31. London: Croom Helm.

Cogen, C. 1977. On three aspects of time expression in American Sign Language. In L.A. Friedman (ed.), *On the other hand: New perspectives on American Sign Language*, 197–214. New York: Academic Press.

Grose, D.R. 2003. *The perfect tenses in American Sign Language: Nonmanually marked compound tenses*. Purdue University MA thesis.

Jacobowitz, E.L. & W.C. Stokoe. 1988. Signs of tense in ASL verbs. *Sign Language Studies* 60. 331–339.

Massone, M.I. 1994. Some distinctions of tense and modality in Argentinian Sign Language. In I. Ahlgren, B. Bergman & M. Brennan, (eds.), *Perspectives on sign language structure. Papers from the Fifth International Symposium on Sign Language Research*, 121–130. Durham: ISLA.

Pfau, R., M. Steinbach & B. Woll. 2012. Tense, aspect, and modality. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 186–204. Berlin: De Gruyter Mouton.

Schermer, T. & C. Koolhof. 1990. The reality of time-lines: Aspects of tense in Sign Language of the Netherlands (SLN). In S. Prillwitz & T. Vollhaber (eds.), *Proceedings of the Forth International Symposium on Sign Language Research*, 295–305. Hamburg: Signum.

Sinte, A. 2013. Expression of time in French Belgian Sign Language (LSFB). In L. Meurant, A. Sinte, M. Van Herreweghe & M. Vermeerbergen (eds.), *Sign language research, uses and practices: Crossing the views on theoretical and applied sign language linguistics*, 206–235. Berlin & Nijmegen: De Gruyter Mouton & Ishara Press.
Zucchi, S. 2009. Along the time line: Tense and time adverbs in Italian Sign Language. *Natural Language Semantics* 17. 99–139.

General sources on tense:

Bybee, J., R. Perkins & W. Pagliuca. 1994. *The evolution of grammar: tense, aspect and modality in the languages of the world.* Chicago: University of Chicago Press.
Chomsky, N. 1968. *Language and mind*. Cambridge, MA: The MIT Press.
Comrie, B. 1985. *Tense.* Cambridge: Cambridge University Press.
Dahl, Ö. 1985. *Tense and aspect systems.* Oxford: Blackwell.
Klein, W. 1994. *Time in language*. London: Routledge.
Lakoff, G. & M. Johnson. 1980. *Metaphors we live by*. Chicago: University of Chicago Press.

3.3 Aspect

3.3.0 Definitions and challenges

3.3.0.1 What is aspect?

Aspect is generally considered a grammatical category that is deeply intertwined with the categories of tense and modality, and therefore, tense, aspect, and modality markers (TAM-markers) are often dealt with in close combination. Grammatical aspect expresses the relation between the speaker and the internal temporal organization of actions, events, states, and processes. It thus concerns the way temporal structures of events are perceived. In contrast, tense expresses the temporal relation between the utterance time and the event time itself. Usually, two types of aspect are described: grammatical aspect, also called *viewpoint aspect* (Smith 1997), which involves inflectional or derivational linguistic devices; and lexical aspect, also called *situation aspect*, *inner aspect*, or *Aktionsart*, where aspect is encoded as inherent features and characteristics of lexical items (such as predicates, e.g. state, activity, accomplishment, achievement; cf. Pustejovsky 1991). This section only considers grammatical (viewpoint) aspect. However, given that there are suggestions in the literature that lexical (situation) aspect, in terms of event structure [Semantics – Chapter 3] / event structure, may also involve dedicated morphemes in sign languages (e.g. Wilbur 2008, 2010), the grammar writer may wish to add a section on lexical aspect. In this case, a level should be added to the table of contents, as headers 3.3.1 and 3.3.2 would be "Grammatical aspect" and "Lexical aspect", respectively.

Let us just add a few words about lexical aspect/event structure, such that the grammar writer knows what to look for. In a nutshell, lexical aspect refers to aspectual properties that are inherent to a predicate. For instance, telic predicates, which describe events with a clear endpoint (e.g. *arrive*, *hit*), have to be distinguished from

atelic ones, which describe an unbounded event (e.g. *smoke*, *sleep*). Without going into much detail, it has been suggested that telic predicates in sign languages typically involve a clear endpoint in their phonological specification, be it a hold or contact with a body part, while atelic predicates are typically characterized by repeated movement without a clear phonological endpoint. An example for the former is the LIS verb MARRY (see left video below), and for the latter the LIS verb DISCUSS (see right video below). It has therefore been argued that the relevant phonological features function as morphemes determining the event structure of a predicate (e.g. the feature [contact] functioning as a telic morpheme). If such features are indeed found to systematically distinguish different event types in the sign language to be described, it may make sense to include a separate section on event structure.

 4_3.3.0.1_1_LIS_TELIC_MARRY  4_3.3.0.1_2_LIS_ATELIC_DISCUSS (LIS)

MARRY DISCUSS

Sign languages have been found to show a considerable amount of similarities in their realization of TAM-markers. For instance, sign languages do not usually express tense by means of verbal inflection, that is, they generally lack tense marking on the verb. Rather, they employ tense markers [Lexicon – Section 3.3.1] and time adverbials [Lexicon – Section 3.5.2] to express tense. With regard to aspect, however, sign languages have been found to exhibit a rich system of morphological marking. Aspectual information is systematically encoded by (i) means of verbal inflection (most importantly, modulations affecting manner and frequency of movement, as first noted by Klima & Bellugi (1979)), and (ii) free morphemes such as adverbials or auxiliaries [Lexicon – Section 3.3.2].

This section provides information about how sign languages may express the different types of verbal aspect subsumed under the two broad notions *imperfective* and *perfective* (following Comrie 1976). Verbal inflection for aspect, such as movement manipulations, repetition, and lengthening are non-concatenative morphological processes and indeed, simultaneity plays an important role in aspectual marking in sign languages. This section provides an overview of the most common bound aspectual morphemes, their meaning, and their phonological realization.

3.3.0.2 Methodological challenges

This section follows traditional distinctions of aspectual categories and provides examples for common categories such as *habitual*, *progressive*, and *iterative*, for instance. Given the overarching binary structure distinguishing *imperfective* from *perfective*, this section mirrors the structure of the chapter on aspect [Semantics – Chapter 2] in the Semantics Part and similarly subsumes the different aspectual categories under these two classes. In addition, the Semantics Part also comprises information on event structure and lexical aspect.

However the grammar writer is free to adopt either a hierarchically flatter structure (abolishing the distinction between imperfective and perfective) or a more fine-grained sub-categorization. Studies on aspect in sign languages have actually come up with different classifications and various numbers of aspect types: from 15 different types of aspect modulations in Klima & Bellugi (1979) to the distinction of 6 aspectual morphemes in Rathmann (2005). This section addresses inflectional aspect marking for *habitual*, *continuative/durative*, *conative*, *iterative*, *inceptive/inchoative*, and *completive*. The grammar writer should be aware of the fact that this is not an exhaustive list. Liddell (1984), for instance, discusses the *unrealized inceptive*, which may be analyzed as a particular form of a conative and which may constitute a modality-specific form of aspectual marking in sign languages (see Rathmann 2005). As a further example of unclear cases, the so-called *incessive* – a fast recurrence of some typical properties – is included under the *iterative* by Rathmann (2005), but subsumed under the *habitual* by Wilbur (1987).

As mentioned above, another terminological issue should be kept in mind, as Smith (1997) distinguishes between *situation aspect* (i.e. lexical aspect showing intrinsic temporal features of the situation) and *viewpoint aspect* (i.e. grammatical aspect showing how the situation is displayed by the speaker).

With regard to the close relation between tense and aspect, the grammar writer should note that there are signs, such as ASL or DGS FINISH, which may function as temporal markers, but can also be used to mark completive aspect (cf. Janzen 1995; Fischer & Gough 1999; Happ & Vorköper 2006; Herrmann 2013). Although this example concerns a free aspectual marker [Lexicon – Section 3.3.2], not aspectual inflection, the grammar writer should be aware of the interaction between tense and aspect and closely inspect the markers to see which category is encoded by specific signs and/or modifications.

3.3.1 Imperfective

The notion *imperfective aspect* implies that an event or activity is not completed, that is, either ongoing, repeated, or habitual, generally irrespective of the event time (past, present, future). This section lists morpho-phonological verbal markings that indicate an event as imperfective and discusses habitual (3.3.1.1), continuative/durative (3.3.1.2), and conative (3.3.1.3) aspects.

3.3.1.1 Habitual

Habitual aspect concerns regular or usual behavior and indicates the continuity of the repeated events. There is a general tendency for this event to happen (e.g. 'I usually go shopping on Saturday.'). Phonologically, the habitual is expressed by reduplication of the verb stem in many sign languages. In addition, to distinguish the habitual from the iterative, the movement repetitions are said to be smaller and faster (Rathmann

2005) – at least in some sign languages. Thus, the pauses in between the movements are quite short.

4_3.3.1.1_1_DGS_SATURDAY IX-1 SHOPPING GO++

SATURDAY IX_1 SHOPPING GO++ (fast and small repetition)
'I usually go shopping on Saturday.' (DGS)

Note that recent findings indicate that there may well be some variation across sign languages in this area, as research on NGT observes a complex combination of manual modulations and non-manual markings, such as gaze aversion and mouth patterns (cf. Hoiting & Slobin 2001).

3.3.1.2 Continuative/durative

The morpheme expressing continuative aspect, also labeled *durative*, indicates that the event takes place over a long and uninterrupted time interval (e.g. 'I trained for the competition all day long.'). An example of continuative aspect is the English progressive aspect [Semantics – Section 2.1.3], marked by the suffix *-ing*, which implies that an event is ongoing and evolving (e.g. 'He is clean**ing** the bathroom'). As a common marker for continuative in most sign languages, slow reduplications involving arc movements are described (cf. Pfau, Steinbach & Woll 2012). This results in the lengthening of the verbal root and often in a circular movement.

STUDY+$_{arc}$+$_{arc}$ ('study for a long time') (ASL)
LOOK-h ('look for a long time') (BSL)

It is important to note that, depending on the phonological form of the verb, there may be different markings for this aspect within the same sign language. BSL verbs that lack path movements, such as LOOK, for instance, receive an extended final hold (glossed as 'h' in the above example) to semantically encode a durative temporal interval (Sutton-Spence & Woll 1999). It might again be useful to also study the non-manual features accompanying the inflected verbs, as research on non-manuals in relation to aspectual marking is rare. Researchers have noted that continuative aspect often includes specific mouth patterns such as pursed lips, puffed cheeks, and blowing of air (see Hoiting & Slobin 2001). For TİD, Dikyuva (2011) describes a specific non-manual marker for continuative aspect that is labeled 'lele' and that involves a repeated and rapid flicking of a slightly protruded tongue. If such non-manual markers are found to systematically occur in the sign language under investigation, they should be included in this section.

3.3.1.3 Conative

Conative aspect signals that someone is trying to do something with the implication that the event is about to occur, usually not yet finished, thus imperfective, and that

in most cases the activity won't be finished in the future. In the literature, the term "conative" is sometimes used as a cover term for various related aspect types, such as the *unrealized inceptive*, the *delayed inceptive*, and the *unaccomplished aspect* (Rathmann 2005). The *unrealized inceptive*, meaning that someone was about to do something but then did not (e.g. 'I was about to send an e-mail when the doorbell rang'), is realized (in ASL) by interrupting the movement and holding the phonological configuration of the sign (i.e., handshape, location) (see Liddell 1984). Thus, the sign is not completely articulated, but rather frozen before the endpoint of the sign is reached. The *delayed inceptive*, on the other hand, implies the 'delay of the completion of x', that is, that someone 'finally' or 'at last' did something (e.g. 'I finally wrote the letter'). As for phonological marking, again for ASL, it includes a trilled movement (articulated either by fingers or the tongue) throughout the path movement, and then the sign syllable [Phonology – Section 2.1.1] is completed after the interruption with a specific mouth pattern at the end.

There are semantic and phonological constraints on the verbs which can undergo this kind of aspectual modification. The verb, for instance, needs to have explicit or implicit telic [Semantics – Section 3.1] / telic meaning. Examples are verbs like RUN-OUT-OFF, UNDERSTAND, ADMIT. In contrast, with verbs such as THINK or FEEL, this aspectual marking is not possible (cf. Brentari 1998: 196). The unaccomplished form postulated by Jones (1978; in Wilbur 1987) has a meaning contribution that can be paraphrased as 'unfinished in present' with regard to an event. Jones distinguishes different types of movement modulations that can realize the unaccomplished aspect, and lists MEET, SNEEZE, and FLY, as examples of verbs that can undergo this change.

It is up to the grammar writer to decide, based on the patterns attested in the sign language that is described, whether these three subcategories indeed exist as separate aspectual classes or whether they should be unified under the notion *conative*. Note that the discussion of the unrealized inceptive may also be subsumed under perfective inceptive aspect [Morphology – Section 3.3.2.2].

3.3.2 Perfective

The notion *perfective aspect* implies that an event or activity is externally seen as a whole unit without internal composition, yet in some sense as closed and completed. Even though this aspectual category closely interacts with tense, it should not be confused with the terminology "the perfect". This section provides an overview of morphophonological verbal markings that indicate an event as perfective; we address iterative aspect (3.3.2.1), inceptive/inchoative aspect (3.3.2.2), and completive aspect (3.3.2.3).

3.3.2.1 Iterative

Iterative aspect implies that an activity or event is repeated, within a certain period of time. Even though the iterative involves a continuous repetition of single events, the events are separate and countable, thus it is in some sense a subtype of perfective aspect. English paraphrases of the meaning contribution could be 'again and again' or 'repeatedly' (e.g. 'She went to the cinema several times / again and again'). The fact that the repetition of events is countable and temporarily bound distinguishes the iterative from the habitual [Morphology – Section 3.3.1.1]. Still, its close relationship with the habitual – as both involve repetition of events – lead some researchers to subsume it under the category of imperfective aspect.

The realization of iterative aspect has been found to be typologically quite consistent across many sign languages: it is usually expressed by fast repetition of the verbal root at the same spatial location of the signing space (e.g. Bergman & Dahl (1994) for SSL; Sutton-Spence & Woll (1999) for BSL; Zeshan (2000) for IPSL; Meir & Sandler (2008) for Israeli SL). In some cases, researchers note that the usual number of repetitions is three times. Inherent repetition of a sign is usually retained in iterative aspect reduplication. By contrast, in continuative aspect, the reduplication is slower and continuous. This also applies to non-manual markings that are lexically specified, such as mouth patterns (see Meir & Sandler 2008).

3.3.2.2 Inceptive/inchoative

This type of aspect marks the starting point of an action or state. We briefly address the inceptive and inchoative as two slightly different perfective aspect forms. Inceptive aspect denotes the beginning of an action (a), whereas inchoative aspect denotes the beginning of a state (b). In the case of a very quick/abrupt start of an action, the term *ingressive* is used.

a. I am starting to sing.
b. The sun started to shine.

With regard to inchoative aspect, some spoken languages feature verb classes that are inherently marked for inchoative aspect, usually with specific affixes, such as German *er-röten* ('to blush'; lit. 'to become red'). For sign languages, however, only a few studies are available to date. Recently, Dikyuva (2011) identified a non-manual marker, which he glosses as 'ee', that functions as an inceptive/inchoative aspect marker in TİD; this marker consists of an intense mouth pattern (gritting the teeth, pulling back the corners of the mouth). Again, it may be fruitful to more closely study these aspectual categories and to investigate potential movement modifications on the verb in combination with non-manual markings.

The unrealized inceptive, as the term suggests, has also been discussed under the notion of inceptive aspect, but the issue whether or not it rather belongs to the conative aspect [Morphology – Section 3.3.1.3] category is still under debate.

3.3.2.3 Completive

The completive marks an action as completed (e.g. 'I have done/completed/finished my homework'). Across sign languages, completive aspect is commonly marked by free morphemes [Lexicon – Section 3.3.2] such as FINISH or READY. Inflectional marking of completive aspect on the verbal root appears to be rare. Nevertheless, for TİD, it has been noted that some verbs may undergo a certain morphological change to indicate completive aspect, namely an accentuated movement combined with a head nod or body lean forward (Zeshan 2003). As for non-manual marking, Dikyuva & Zeshan (2008) further identify a tongue protrusion marker labeled 'bn' and argue that it may also be used to indicate completive aspect in TİD (but see Karabüklü (in progress) for a different analysis). This marker appears more frequently on action verbs than on stative verbs, but more research is needed.

What makes the identification and description of completive markers difficult – be they manual or non-manual – is the fact that in the literature, one and the same marker is sometimes described as marking the perfective and the completive. Grose (2003), for instance, argues for ASL that a head nod on the verb or in clause final position may be the only marker for perfectivity and thus indicates completive aspect. For DGS, researchers have observed that a head nod may accompany certain perception and psych verbs, such as SEE, LEARN, SMELL, REMEMBER, in order to mark perfective aspect (Happ & Vorköper 2006: 294–296).

References

Main sources on aspect in sign languages:

Anderson, L.B. 1982. Universals of aspect and parts of speech: Parallels between signed and spoken languages. In P.J. Hopper (ed.), *Tense – aspect: Between semantics and pragmatics*, 91–114. Amsterdam: John Benjamins.

Bergman, B. & Ö. Dahl. 1994. Ideophones in sign language? The place of reduplication in the tense-aspect system of Swedish Sign Language. In C. Bache, H. Basbøll, & C.-E. Lindberg, (eds.), *Tense, aspect and action: Empirical and theoretical contributions to language typology*, 397–422. Berlin: Mouton de Gruyter.

Dikyuva, H. 2011. *Aspectual non-manual expressions in Turkish Sign Language (TİD)*. University of Central Lancashire MA thesis.

Fischer, S.D. 1973. Two processes of reduplication in the American Sign Language. *Foundations of Language* 9. 469–480.

Fischer, S.D. & B. Gough. 1999 [1972]. Some unfinished thoughts on FINISH. *Sign Language & Linguistics* 2(1). 67–77.

Janzen, T. 1995. *The poligrammaticalization of FINISH in ASL*. University of Manitoba, Winnipeg, MA thesis.

Klima, E. & U. Bellugi. 1979. *The signs of language.* Cambridge, MA: Harvard University Press.

Liddell, S.K. 1984. Unrealized inceptive aspect in American Sign Language: Feature insertion in syllabic frames. In J. Drogo, V. Mishra & D. Testen (eds.), *Papers from the 20th Regional Meeting of the Chicago Linguistic Society*. 257–270. Chicago: University of Chicago Press.
Meir, I. 1999. A perfect marker in Israeli Sign Language. *Sign Language & Linguistics* 2(1). 43–62.
Oomen, M. 2016. The marking of two aspectual distinctions in Sign Language of the Netherlands (NGT). *Linguistics in Amsterdam* 9(2), 30–55.
Pfau, R., M. Steinbach & B. Woll. 2012. Tense, aspect, and modality. In Pfau, R., M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 186–204. Berlin: De Gruyter Mouton.
Rathmann, C. 2005. *Event structure in American Sign Language.* University of Texas at Austin PhD dissertation.
Wilbur, R.B. 2008. Complex predicates involving events, time and aspect: Is this why sign languages look so similar? In J. Quer, J. (ed.), *Signs of the time: Selected papers from TISLR 2004*, 217–250. Hamburg: Signum.
Wilbur, R.B. 2010. The semantics-phonology interface. In D. Brentari, D. (ed.), *Sign languages (Cambridge Language Surveys)*, 355–380. Cambridge: Cambridge University Press.

General sources on aspect:

Binnick, R.I. (ed.). 2012. *The Oxford handbook of tense and aspect.* Oxford: Oxford University Press.
Comrie, B. 1976. *Aspect. An introduction to the study of verbal aspect and related problems.* Cambridge: Cambridge University Press.
Dahl, Ö. 1985. *Tense and aspect systems*. Oxford: Blackwell.
Pustejovsky, J. 1991. The syntax of event structure. *Cognition* 41. 47–81.
Smith, C. 1997. *The parameter of aspect (2nd edition)*. Dordrecht: Kluwer.

3.4 Modality

3.4.0 Definitions and challenges

3.4.0.1 What is modality?

It is important to start this section with a terminological note. The grammar writer should be aware that the term "modality" is ambiguous and that this may lead to misunderstandings, especially between spoken and sign language researchers. On the one hand, the term is used to describe a specific grammatical phenomenon that involves the use of modal verbs, mood markers, adverbials, etc. On the other hand, mostly in sign language research, the term "modality" is understood as referring to the different ways of signal production and perception in sign languages versus spoken languages, that is, the visual-manual (or visual-gestural) modality of sign languages as opposed to the oral-auditory modality of spoken languages. However, both spoken and sign languages do, of course, exhibit linguistic means to express the grammatical category of modality. This section provides information about how sign languages may express deontic and epistemic modality on the verb.

Modality is defined as a grammatical category that, in a nutshell, specifies the possibility (a) or necessity (b) of an event to occur (deontic modality), or conveys the attitude of a speaker or signer towards the validity of the content of a proposition (epistemic modality) (c).

a. You **can** borrow my car (= You are allowed to borrow my car).
b. You **have to** return my car by tomorrow evening.
c. He **should** be home by now (= I assume he is home).

Modality can be instantiated by various grammatical means which commonly interact with contextual information:
(i) morphological means such as verbal inflection; verbal mood, as one of the most common ways to encode certain modal notions, for instance, is commonly marked on verbs;
(ii) lexical means such as sentence adverbs [Lexicon – Section 3.5.2] / sentence adverbs (e.g. *hopefully, maybe*), modal verbs [Lexicon – Section 3.3.3] / modal verbs (e.g. *can, must, may*), and modal particles;
(iii) syntactic means, for example, the German infinitival construction with *haben* ('to have').
(iv) prosodic means, such as intonational pitch variations and intonation contours.

Obviously, these various means are not mutually exclusive and very often overlap and co-occur.

3.4.0.2 Deontic and epistemic modality

As already briefly mentioned above, traditionally two types of modality [Semantics – Chapter 4] are distinguished: (i) *deontic modality*, which refers to obligations, recommendations, permissions, and intentions; and (ii) *epistemic modality* (sometimes called "evidential modality"), which refers to probabilities and predictions, based on what is known or believed. Other, more fine-grained, distinctions have been suggested in the literature on spoken languages (see Palmer (2001) for a typological perspective). However, the general broad division between deontic and epistemic modality is adopted by most researchers and is the most common starting point for grammar writers and their descriptions of modality in different languages. Nevertheless, the grammar writer may wish to adopt a more fine-grained distinction depending on the facts of the language.

3.4.0.3 Methodological challenges

The grammar writer should note that sign languages may express modality by various of the above-mentioned means, such as independent lexical items (e.g. modal verbs [Lexicon – Section 3.3.3], adverbs, specific particles) and non-manual markers on the verb or the entire sentence. The paradigm is not necessarily complete, and the grammar writer should investigate carefully the potential overlap of certain expressions in terms of deontic and epistemic readings. In fact, in many spoken languages, certain modal verbs may have both deontic and epistemic readings, too, as illustrated by the following examples.

a. John muss zu Hause sein. (German)
   John must at home be
b. John must be at home.

For both examples:
(i) Deontic reading: 'It was required for John to be at home.'
(ii) Epistemic reading: 'It is possible and there is evidence that John is at home.'

In sign languages, however, it seems to be the case that epistemic readings of modal verbs are rare, or at least quite marked, and that signers tend to interpret modal verbs as deontic markers only. Deontic modality in ASL, for instance, is expressed by modals such as MUST, SHOULD, and CAN. Ambiguity of some modals with regard to deontic and epistemic interpretations has been described for ASL (see Wilcox 1996: 481, 488 for MUST and MAYBE). However, for the most part, MUST and SHOULD cannot receive epistemic readings. The rather exceptional cases of epistemic readings in ASL, however, suggest a grammaticalization from deontic to epistemic uses of modals in ASL (see Wilcox 1996: 490; Wilcox & Wilcox 1995: 145).

It is important to be aware of the fact that direct translations of modals are not always straightforward or even available. In DGS, for instance, the signs MUST and SHALL are used if a third person provides the command or suggestion for the respective activity. The translation of 'I *have to* go shopping. My fridge is empty.' into DGS, on the other hand, does not necessarily include the sign MUSS ('must'). Rather, the translation involves a sign glossed as HINNEHM ('accept/acquiesce'), specific non-manuals, and a modification of the verb's movement (see Happ & Vorköper 2006: 364). Furthermore, it has been reported for a variety of Libras that signs that are equivalent to various Portuguese modals do exist, but that the number of modal verbs is smaller in Libras (see Ferreira-Brito 1990). This shows again that there is no one-to-one relation between modals in spoken and in signed languages and that not all of the modality notions are expressed manually in sign languages.

The challenges described here concern modal verbs, but it is quite possible that the grammar writer will encounter similar complexities – that is, ambiguities and translation mismatches – when describing inflectional marking of modality.

3.4.1 Deontic modality

As mentioned previously, deontic modality [Semantics – Chapter 4] usually concerns obligations (*must*), recommendations (*should*), permissions (*can*), and intentions (*want*), and thereby refers to the speaker's attitude towards the necessity or permissibility of an act or event. In sign languages, deontic modality is usually expressed through manual signs, such as modal verbs [Lexicon – Section 3.3.3].

Still, Lackner (2013), in her detailed description of modality in ÖGS, emphasizes the importance of various non-manual markers, such as head and body movements,

for the expression of modality. For deontic modality, she observes that the non-manuals usually spread across the verb phrase. Many non-manual sentence adverbs, however, accompany the whole sentence in sign languages, and it may therefore be interesting to compare utterances with and without modal contexts. In general, however, deontic modality is rarely expressed by non-manual features alone – in contrast to epistemic modality (see next section [Morphology – Section 3.4.2]).

Lackner (2013) also stresses that methodologically, it is important to analyze signed narration when investigating the expression of modality, as elicited sentences usually only reveal manual means of expression instead of non-manual marking.

3.4.2 Epistemic modality

Epistemic modality is concerned with the speaker's attitude towards the actual proposition, judging the truth of the sentence and referring to the probability that the state of affairs or event described by the utterance is true/false, has been true/false, or will be true/false. Thus, epistemic modality addresses what is known or believed and indicates how much certainty or evidence a speaker has for his utterance. As above, this section only deals with verbal (and clausal) modifications indicating epistemic modality in sign languages, while lexical expressions of modality [Lexicon – Section 3.3.3] are addressed in the Lexicon Part.

In the following ASL example, the signer signals that he is certain about the event encoded in the utterance by using a combination of the non-manuals head nod, squint, and eyebrows squeezed together (which are glossed as 'wh+q'). Thus, the epistemic modality is expressed by a non-manual modification of the verb.

Context: two people enter a meeting in a basement room early in the morning.
It is cloudy and cold. At lunch:
A: Do you think it's raining outside?
   wh+q
B: RAIN
   'Surely it's raining.' (ASL, adapted from Wilcox & Wilcox 1995: 147)

Modal particles, as attested in some spoken languages such as German and Dutch, appear not to have manual equivalents in the sign languages studied to date; rather the modal meaning conveyed through modal particles is instantiated by combinations of non-manual features in sign languages (Herrmann 2013). Compare the following example from German, in which the modal particle (MOD-PART) conveys the epistemic meaning 'probably', with the DGS example, in which the same meaning is expressed non-manually (the modality non-manual marker abbreviated as 'mod' involves a specific mouth pattern and slow headnods).

Er	ist	*wohl*	schon	zu	Hause.
he	is	MOD-PRT	already	at	home

'He probably is already at home.' (German)

mod
IX$_3$ AT-HOME
'He probably is already at home.' (DGS)

The non-manuals that convey the degree of the signer's confidence and commitment towards his proposition can be compared to intonation [Phonology – Section 2.3] / intonation. Intonational contours in spoken languages may also function as indicators of epistemic modality. Many sentence adverbs [Lexicon – Section 3.5.2] indicating epistemic modality (e.g. an adverb meaning 'probably') have manual and non-manual equivalents in sign languages. The relevant non-manuals may either accompany manual modals or modify the entire sentence (see Wilcox & Wilcox (1995: 148) for ASL; Herrmann (2013) for DGS). For instance, the non-manuals indicating 'probably' in DGS scope over the entire proposition and include affirmative head nods, a specific mouth pattern, and squinted eyes – these non-manuals may express the epistemic meaning even in the absence of the manual adverbial. For ÖGS, Lackner (2013: 353) discusses one non-manual possibility marker in the form of a sideward head tilt and/or a sideward body lean; the resulting meaning can be paraphrased as 'maybe' because it expresses the potentiality/possibility of an unrealized event. Most importantly, non-manuals that scope over the sentence may indicate gradual differences along the continuum of probability and improbability.

The non-manual markers that may express epistemic modality by themselves – no matter whether they accompany only the predicate or spread over (part of) the sentence – should be described in this section, even if it is not entirely certain whether they indeed constitute morphemes that attach to verbs.

References

Main sources on modality in sign languages:

Ferreira-Brito, L. 1990. Epistemic, alethic, and deontic modalities in a Brazilian Sign Language. In S.D. Fischer & P. Siple (eds.), *Theoretical issues in sign language research. Vol.1: Linguistics,* 229–260. Chicago: University of Chicago Press.

Herrmann, A. 2013. *Modal and focus particles in sign languages. A cross-linguistic study.* Berlin: De Gruyter Mouton.

Lackner, A. 2013. *Linguistic functions of head and body movements in Austrian Sign Language (ÖGS). A corpus-based analysis*. University of Graz PhD dissertation.

Pfau, R. & J. Quer. 2007. On the syntax of negation and modals in Catalan Sign Language and German Sign Language. In P. Perniss, R. Pfau & M. Steinbach (eds.): *Visible variation. Comparative studies on sign language structure,* 129–161. Berlin: Mouton de Gruyter.

Shaffer, B. 2000. *A syntactic, pragmatic analysis of the expression of necessity and possibility in American Sign Language*. University of New Mexico, Albuquerque, PhD dissertation.

Wilcox, P. 1996. Deontic and epistemic modals in ASL: A discourse analysis. In A. Goldberg, (ed.), *Conceptual structure, discourse and language*, 481–492. Cambridge: Cambridge University Press.

Wilcox, S.E. & B. Shaffer. 2006. Modality in ASL. In W. Frawley (ed.), *The expression of modality*, 207–237. Berlin: Mouton de Gruyter.

Wilcox, S.E. & P. Wilcox. 1995. The gestural expression of modality in ASL. In Bybee, J. & S. Fleischman (eds.), *Modality in grammar and discourse*, 135–162. Amsterdam: John Benjamins.

General sources on modality:

Blakemore, D. 1994. Evidence and modality. In R.E. Asher (ed.), *The encyclopedia of language and linguistics*, 1183–1186. Oxford: Pergamon Press.

Bybee, J. & S. Fleischman. 1995. Modality in grammar and discourse. An introductory essay. In J. Bybee & S. Fleischman (eds.), *Modality in grammar and discourse*, 1–14. Amsterdam: John Benjamins.

Haan, F. de. 2006. Typological approaches to modality. In W. Frawley (ed.), *The expression of modality*, 27–69. Berlin: Mouton de Gruyter.

Kratzer, A. 1991. Modality. In A. von Stechow & D. Wunderlich (eds.), *Semantics: An international handbook of contemporary research*, 639–650. Berlin: Walter de Gruyter.

Palmer, F.R. 2001. *Mood and modality*, 2nd ed. New York: Cambridge University Press.

Portner, P.H. 2009. *Modality.* Oxford: Oxford University Press.

Saeed, J.I. 2003. Sentence semantics 1: Situations: 5.3. Modality and evidentiality. In J.I. Saeed (ed.), *Semantics*, 138–145. Malden, MA: Blackwell.

3.5 Negation

3.5.0 Definitions and challenges

3.5.0.1 General definitions

By means of negation, the polarity of a clause is changed from positive to negative. Negation can, for instance, indicate that an attribution is not true (e.g. *John is not smart*) or that an event has not occurred (e.g. *He did not sign the contract*). In all languages, speakers use some dedicated strategy to negate either words or sentences, while the positive counterpart usually remains unmarked. In other words: while a negative element is required to signal negation, a positive clause does not require the use of a dedicated positive marker.

In studies on sign languages, negation has received a considerable amount of attention and has been studied in more detail than many other phenomena (Quer 2012). Zeshan (2004, 2006b) conducted a typological comparative study, using a broad sample of sign languages. These studies revealed that negation in sign languages can be marked by manual or non-manual means, often in combination. Manual signs encode negative meanings and can be of various types. Non-manual negation (mostly, but not exclusively, the use of a headshake) is very common across sign languages and is also capable of conveying negative meaning.

Throughout the Blueprint (and by implication, the grammar), negation makes an appearance in various parts. In the section on negatives in the Syntax Part [Syntax – Section 1.5], we address negation as a syntactic strategy (as in the English examples

in the first paragraph), including issues such as word order and scope of the non-manual marker. It is important to note that sentential negation may involve free elements (such as English *not*) or bound elements (such as the Turkish negative suffix *-mi* in e.g. *bil-mi-yor-um* (know-NEG-TNS-1SG = 'I don't know')). The free elements are presented in the section on negative particles [Lexicon – Section 3.11.1]. In the section "Derivation" in the Morphology Part, we address negative derivation [Morphology – Section 2.1.1.2]; that is, the use of affixes with negative meaning that may potentially change the word category (as in English *powerless*). Derivational negation does not negate the entire sentence but only the meaning of the constituent it attaches to (see also *unhappy*) – although the line is not always easy to draw.

In the present section, we are concerned with negation as an inflectional category. This implies that (i) the negative marker is a bound element, (ii) it cannot change the word category, and (iii) it expresses sentential negation. The Turkish suffix mentioned above is of this type. In Turkish, this suffix can attach to all verbs (and also other non-verbal predicates). While sentential negation by means of free-standing manual and/or non-manual markers is attested in all sign languages, inflectional negation (just like derivational negation) appears to be severely limited and usually restricted to a small set of verbs (Zeshan 2004, 2006b).

3.5.0.2 Methodological challenges

In the section on negative derivation, we already pointed out that it may, at times, be difficult to distinguish derivational from inflectional processes, in particular if the derivational process does not change the category. Similarly, it may be challenging to distinguish inflection from cliticization (as in English *can't*, *don't*, *shouldn't*).

Another challenge is posed by the fact that in virtually all sign languages for which a potential negative inflection process has been identified, this process only applies to a very limited number of verbs. The question therefore is: if the process only applies to, say, one or two verbs, should it be considered an inflectional process? Or, to put it differently, how productive does the process have to be in order to qualify as an inflectional process?

As for these challenges, we encourage the grammar writer to proceed as follows: first, even if it cannot be determined with certainty whether the process is inflection or cliticization, it should be included in this section, especially if it applies to various hosts in the same way. Second, and related to the first point, we suggest to also mention processes that are of very limited productivity, as these may not be addressed elsewhere in the grammar. An exception might be the negation of modal verbs. For these, the grammar writer might decide to include them here and/or in the section on modal verbs [Lexicon – Section 3.3.3] in the Lexicon Part.

Note that in the following sections, we distinguish regular and irregular negation strategies. However, depending on the phenomena attested in the sign language to be described, it might also make sense to distinguish manual markers from non-manual

markers and to include the distinction between regular and irregular negation under manual markers.

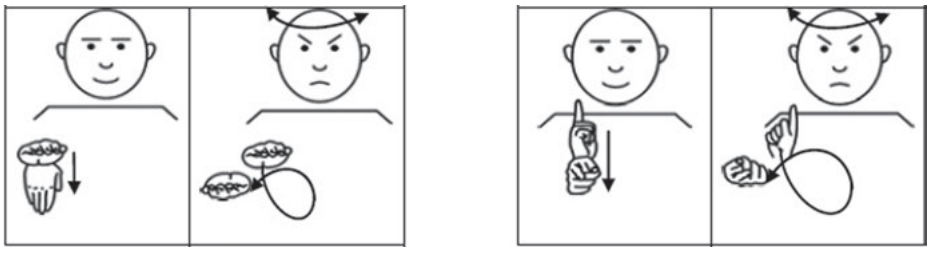
3.5.1 Regular negation

Under regular inflectional negation, the grammar writer should discuss processes in which the stem with which the negative marker combines can still be identified (see the Turkish example and the English cliticized forms above – in all cases, the verb that is negated is easily identified).

It should be pointed out that some of the processes we describe here under "regular negation" have been subsumed by other authors under the label "irregular negatives" (e.g. Quer 2012). This choice of label is motivated by the fact that the manual negation strategies discussed in the next section are irregular when compared to the general strategy of clause negation in the sign language. For instance, in DGS, clausal negation usually involves the clause-final particle NOT (e.g. INDEX_1 READ NOT, 'I don't read'), and therefore, negation of a modal verb by means of a movement modification (as discussed in section 3.5.1.1) could be considered irregular. Yet, as an inflectional process that applies to a number of verbs, the movement modification is fully regular – and we therefore treat it as such. Only inflectional processes that are fully idiosyncratic will be treated as irregular negation.

3.5.1.1 Manual markers

In many sign languages, there are signs, mostly modal verbs, that incorporate negation in a (more or less) regular way (e.g. Shaffer (2002) for ASL; Pfau & Quer (2007) for DGS and LSC). As pointed out previously, it may at times be difficult to determine whether the negative element is a true inflectional affix or a clitic. If it is phonologically similar to an existing free negative element, then the cliticization scenario may be more likely. For illustration, consider the following DGS examples.



MAY MAY^NOT MUST MUST^NOT

(DGS, Pfau & Quer 2007: 147)

Both modal verbs MAY and MUST in the examples above (as well as CAN and NEED) are negated by a movement change (α-shaped movement); this movement is not transparently related to the form of the negative particle NOT (a 𝅘𝅥-hand performing a sideward movement towards the ipsilateral side in front of the signer's body), and the process may therefore constitute a true inflectional process, which applies to a small number of verbs, rather than an instance of cliticization. The pairs MAY – MAY^NOT and MUST – MUST^NOT are further illustrated by videos below.

4_3.5.1.1_2_DGS_MAY - MAY^NOT

MAY – MAY^NOT

4_3.5.1.1_3_DGS_MUST - MUST^NOT

MUST – MUST^NOT (DGS)

Often, however, the negative marker is more transparently related to an independent negative sign. This is true, for instance, in the following example from TİD, where the negative sign exists independently. However, when combined with a verb, as e.g. KNOW, its movement is reduced, its location is displaced towards that of the verb, and it thus sort of fuses with the verb. Yet, the negative component can still be identified. Cases like this are likely to be the result of cliticization. Still, the grammar writer may wish to address such cases in this section, especially if the process only applies to a limited number of verbs that can be listed in the grammar.

KNOW^NOT ('know not') (TİD, Zeshan 2004: 46)

The manual negative morpheme that combines with a verb can also be simultaneous in nature. HKSL and some other East Asian sign languages, for instance, feature a "negative handshape", the 𝅘𝅥-handshape. This handshape is found in some signs with negative meaning (e.g. BAD, DIRTY; cf. Yang & Fischer (2002) for CSL), but it can also be used to change the meaning of a verb from positive to negative (Zeshan 2006b: 51). The negative handshape can be added sequentially to monomorphemic signs, but it may also replace the handshape of the underlying verb, as e.g. in the HKSL verb KNOW^BAD ('don't know'; the underlying verb has a 𝅘𝅥-handshape).

KNOW^BAD ('don't know') (HKSL, Tang 2006: 223)

Taken together, the grammar writer should search for movement, orientation, and handshape changes that may – sequentially or simultaneously – combine with verbs to negate them, even if these changes only apply to a limited number of verbs. If possible, the verbs to which the process applies should be listed. If the process only applies to modal verbs, then it could be described in this section and/or in the section on lexical markers of modality [Lexicon – Section 3.3.3].

3.5.1.2 Non-manual markers

In virtually all sign languages studied to date, negation is not only expressed by manual markers but also by non-manual markers. In fact, in many sign languages, it is common to negate a clause by a non-manual marker only. The most common negative non-manual is a headshake; in addition, in some geographical areas, a backward head tilt is also attested. These head movements may be accompanied by negative facial expressions (e.g. squinted eyes, lowered eyebrows, frowning, nose wrinkling; Zeshan 2004: 12f), but it seems uncommon that facial expressions can negate a clause by themselves. The interplay of manual and non-manual negative markers will be subject to further discussion in the section on negatives in the Syntax Part [Syntax – Section 1.5]. Here, we will only be concerned with the possibility of a non-manual marker functioning as a (simultaneous) inflectional affix.

Consider the headshake, which in many sign languages can negate a clause by itself, as shown in the following LSC example, in which the headshake ('hs') accompanies only the verb.

hs
SANTI MEAT EAT
'Santi does not eat meat.' (LSC, Quer 2012: 318)

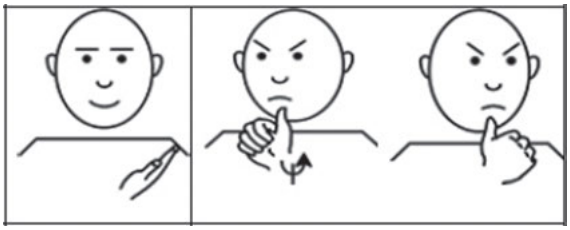
Assume that in a sign language, the headshake always only accompanies the verb. One would then have good reason to suggest that it indeed functions as a simultaneous inflectional affix. However, to the best of our knowledge, to date no such sign language has been described. Rather, it appears that the headshake commonly spreads onto adjacent signs, for instance onto the object in the above example. Some researchers have suggested that the headshake might still be considered an affix, which, however, is capable of spreading – just like tone in some spoken languages (Pfau 2008, 2015). It is up to the grammar writer to decide whether s/he wants to include such cases in this section. Note finally that researchers have found that in some sign languages the headshake or head tilt only accompanies the manual negative sign. Given that in these sign languages the manual negator does not exist without the non-manual – in contrast to the verb EAT in the LSC example above – it seems very unlikely that the non-manual functions as an affix in these cases. Rather, it is probably lexically specified for the manual negator.

3.5.2 Irregular negation

In sign languages, as in spoken languages, the negative form of certain verbs can be entirely different from their positive counterpart, such that no distinct negative element can be identified; in this case, we are dealing with negative suppletion. In Turkish, for instance, the negative form of the verb *var* ('to exist') is *yok* ('to not exist'), even though Turkish has two negative markers, one for verbal stems, the other for non-verbal stems. However, none of these two markers is identifiable in *yok*, which is thus idiosyncratic.

Although, strictly speaking, negative suppletion is not a morphological process, the grammar writer should include suppletive forms here, even though some of them may also make an appearance in another part of the grammar. The grammar writer should be aware that negative suppletion is not very common in sign languages and is usually limited to a few signs in an individual language (Zeshan 2006b: 49). LSE, for instance, features only a single case of negative suppletion, which is the negative existential (i.e. a case comparable to the Turkish example above). Yet, there are sign languages which have more than five suppletive negatives (Zeshan 2006b: 50).

For illustration, consider the following examples from DGS and ÍTM; the DGS example involves a modal verb, while in ÍTM, negative suppletion is attested for the lexical verb KNOW, as illustrated by the two videos below which show the positive sign and its negative counterpart. Actually, across sign languages, negative suppletion is most common for modal verbs and existentials.



WANT WANT-NOT (DGS, Pfau & Quer 2007: 147)

4_3.5.2_2_ITM_KNOW 4_3.5.2_3_ITM_KNOW^NOT

KNOW ('to know') KNOW-NOT ('to not know') (ÍTM)

Clearly, in both examples, there is no or little phonological overlap between the positive sign and its negative counterpart. In ÍTM, the negative sign KNOW-NOT shares with its positive counterpart the location, but both the handshape and movement are different. However, neither the handshape nor the movement of KNOW-NOT are found to mark negation in any other ÍTM verb.

The grammar writer should be aware of the fact that when an irregular negative is available in the sign language, it usually blocks the combination of the non-negative predicate with an independent manual negator or with a non-manual marker that otherwise can express sentential negation [Syntax – Section 1.5] on its own – that is, the DGS modal verb WANT can neither be negated by a combination with the negative particle NOT nor by a simultaneous headshake. This generalization, however, is not without exceptions.

Elicitation materials

If a dictionary exists, it is likely that at least some of the exceptional (cliticized or suppletive) forms can be found in the dictionary. The typological studies compiled in Zeshan (2006a) make use of a questionnaire that is also contained in the volume. Pictures can be combined with questions in order to elicit negative statements (e.g. showing a picture on which a woman buys apples and asking 'Does the woman buy flowers?'). The grammar writer should keep in mind, however, that this strategy is likely to elicit constituent negation or replies like 'No, she buys apples'. See also the notes concerning elicitation materials in the section on negation in the Syntax Part [Syntax – "Elicitation materials" in Section 1.5]. For signs that are in semantic opposition (e.g. GOOD – BAD, CLEAN – DIRTY), a signer could be shown the positive member of the pair and asked to produce the negative counterpart. This way, one might be able to discover negative handshapes, for instance. Finally, corpus data can be used, if

available. On the basis of corpus data, one might, for instance, come to know whether it is possible for a headshake to co-occur with only a predicate in a clause. Especially in the absence of a manual negator, this might suggest that the headshake functions as a non-manual (featural) affix.

References

Main sources on negation in sign languages:

Bergman, B. 1995. Manual and nonmanual expression of negation in Swedish Sign Language. In H. Bos & T. Schermer (eds.), *Sign Language research 1994: Proceedings of the Fourth European Congress on Sign Language Research*, 85–103. Hamburg: Signum.

Gökgöz, K. 2011. Negation in Turkish Sign Language: The syntax of nonmanual markers. *Sign Language & Linguistics* 14(1). 49–75.

Pfau, R. 2008. The grammar of headshake: A typological perspective on German Sign Language negation. *Linguistics in Amsterdam* 1. 37–74.

Pfau, R. 2015. The grammaticalization of headshakes: From head movement to negative head. In A.D.M. Smith, G. Trousdale & R. Waltereit (eds.), *New directions in grammaticalization research*, 9–50. Amsterdam: John Benjamins.

Pfau, R. & J. Quer. 2007. On the syntax of negation and modals in German Sign Language (DGS) and Catalan Sign Language (LSC). In P. Perniss, R. Pfau & M. Steinbach (eds.), *Visible variation. Comparative studies on sign language structure*, 129–161. Berlin: Mouton de Gruyter.

Quer, J. 2012. Negation. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 316–339. Berlin: De Gruyter Mouton.

Veinberg, S.C. & R.B. Wilbur. 1990. A linguistic analysis of the negative headshake in American Sign Language. *Sign Language Studies* 68. 217–244.

Zeshan, U. 2004. Hand, head and face: Negative constructions in sign languages. *Linguistic Typology* 8. 1–58.

Zeshan, U. (ed.). 2006a. *Interrogative and negative constructions in sign languages*. Nijmegen: Ishara Press.

Zeshan, U. 2006b. Negative and interrogative constructions in sign languages: A case study in sign language typology. In U. Zeshan (ed.), *Interrogative and negative constructions in sign languages*, 28–68. Nijmegen: Ishara Press.

General sources on negation:

Dahl, Ö. 2011. Typology of negation. In L.R. Horn (ed), *The expression of negation*, 9–38. Berlin: De Gruyter Mouton.

Horn, L. 1989. *A natural history of negation*. Chicago: University of Chicago Press.

Miestamo, M. 2005. *Standard negation: The negation of declarative verbal main clauses in a typological perspective*. Berlin: Mouton de Gruyter.

Payne, J.R. 1985. Negation. In T. Shopen (ed.), *Language typology and syntactic description. Vol. I: Clause structure*, 197–242. Cambridge: Cambridge University Press.

Chapter 4 Nominal inflection

4.0 Definitions and challenges

4.0.1 What is nominal inflection?

Just like verbs, nouns may undergo systematic form changes depending on certain morphosyntactic features, with form changes realized by affixation and/or stem-internal modification. Across spoken languages, the most common features that trigger such changes are number, case, and gender features.

Crucially, in the present chapter, the grammar writer will only address changes that are marked on the noun itself, not changes that affect other elements within the noun phrase, such as adjectives and determiners. In addition, in many languages, inherent features have to be distinguished from contextual features. Inherent features are features specified for nouns in the lexicon, which, however, are not overtly marked on the noun (e.g. gender in many languages). In contrast, contextual features are not specified in the lexicon but are contextually determined, that is, within a sentence or discourse context (e.g. number and case marking).

The following example from German may serve to illustrate the interaction of inherent and contextual features on the one hand, and of marking on the noun versus marking on other elements within the noun phrase on the other hand. The noun *Haus* ('house') carries an inherent gender feature [neuter], which is marked within the noun phrase on the definite determiner. When pluralized (i.e. marked for number), the noun itself undergoes two changes: it takes the suffix *-er* and it is subject to a stem-internal change (umlaut). At the same time, the plural is also marked on other elements within the noun phrase, namely the determiner and the adjective – this is an instance of number agreement within the noun phrase. If German was the language to be described, then only the plural marking on the noun (*Häuser*) would be addressed within the present chapter.

das	schöne	Haus	→	die	schön-en	Häus-er	
DET.N	beautiful	house(N)		DET.PL	beautiful-PL	house-PL	
'the beautiful house'				'the beautiful houses'			(German)

This does not imply that gender would never be relevant to a discussion of nominal inflection. In fact, there are languages that mark gender (or more broadly, noun class) overtly on nouns by means of affixes. A discussion of this type of marking would be appropriate in the context of nominal inflection, even if it is only a strong tendency rather than a strict rule (as, for instance, in the case of Spanish nouns ending on *-a* (feminine) vs. *-o* (masculine)). At present, however, we are not aware of a sign language that would apply such an operation (some East Asian sign languages have been shown to employ handshapes that mark gender, but it is not clear whether these handshapes are systematically used in the way described here).

Obviously, in addition to the features mentioned above, there are other, less common, features that may be marked on nouns in a given language, such as proximity or visibility. Again, at present, we are not aware of a sign language that would mark such features. However, thanks to the availability of three-dimensional signing space, sign languages commonly mark location features on nouns, whether it is on an individual noun ('object is located at locus x') or on multiple nouns in relation to each other ('objects are in relation y to each other'), and this modality-specific property should be addressed in this chapter.

4.0.2 Methodological challenges

There are at least two potential methodological challenges in the domain of nominal inflection. First, if an element marking a specific feature is identified, it may not always be obvious whether it is an affix or a free-standing element. Imagine a sign language that employs gender markers (male/female) that systematically combine with nouns referring to humans that are not inherently specified for gender (e.g. PERSON, FRIEND, TEACHER, etc.). If these markers consistently appear adjacent to the noun, it may be difficult to decide whether they are bound or free elements. Even if the latter seems to be the case, however, such elements should be included in the part on nominal inflection, as the relevant markers neither represent inherent features of nouns nor do they combine with another element within the noun phrase. In other words: in this particular case, the grammar writer would have a good reason to add a subsection on gender. The same line of reasoning would apply to other potential inflectional markers.

Second, as will be detailed further in the section on localization and distribution [Morphology – Section 4.2], there is a clear connection between number and distribution marking. That is, objects can only be distributed or localized with respect to each other if there is more than one object. It may therefore be difficult at times to disentangle these two properties: does a certain modification reflect number marking, distribution, or both? In case of uncertainty, the grammar writer may wish to discuss a certain marker within both subsections. This potential challenge is also related to the issue of Elicitation Materials, as a picture showing a multitude of objects will necessarily depict them in a certain configuration, and consequently, the elicited sign(s) is/are likely to reflect this configuration.

4.1 Number

In this section, the grammar writer will discuss all strategies of nominal plural marking that apply to noun signs [Lexicon – Section 3.1]. There are various ways to address this issue, and the strategy we adopt – that is, a distinction between

manual and non-manual marking – is only one option. In fact, it may well be the case that the sign language to be described does not mark number at all on nouns – or marks it only on very few nouns (see Zeshan (2000) for IPSL, where apparently only the noun CHILD is consistently marked for plural). In this case, the grammar writer may decide to point out the lack of productive plural marking and simply list the nouns that can be marked, along with the plural marking strategies that apply.

4.1.1 Manual marking

We choose a shallow structure, providing only a list of strategies that have been identified in the literature. However, the grammar writer may wish to add additional structure. This may be useful, for instance, if it turns out that the choice of strategy depends on phonological properties of the base noun; that is, if we are dealing with phonologically triggered allomorphy (as has been described for DGS by Pfau & Steinbach (2005, 2006)). Also, a distinction could be made between sequential marking (reduplication) and simultaneous marking (by using the non-dominant hand). Note finally, that in a language that has different manual plural marking strategies, zero marking may be one of them (as e.g. in English *sheep – sheep*).

A plural marking strategy that has been described for many sign languages is reduplication (Pfau & Steinbach 2006). Interestingly, at least in some sign languages, reduplication comes in different shapes. The first one is simple reduplication, where the movement of the sign is simply repeated. This strategy is observed in the DGS noun BOOK, as shown in the left video below.


4_4.1.1_1b_DGS_BOOK – BOOKS


4_4.1.1_2b_DGS_CHILD – CHILDREN

BOOK – BOOK++	CHILD – CHILD++	
('book – books')	('child – children')	(DGS)

Another type of reduplication is sidewards reduplication, whereby the noun, when repeated, is slightly displaced towards one side of signing space. For DGS, Pfau & Steinbach observe that this strategy applies to signs that are not signed in central signing space in front of the body, but rather on the lateral side of the signing space, as for example the noun CHILD (as in the right video above). Crucially, this realization does not have a semantic effect beyond pluralization; in particular, it does not imply that the children are located next to each other (it could, for instance, be used in a sentence like 'I like children').

A third type of reduplication is simultaneous reduplication by the non-dominant hand (Pizzuto & Corazza 1996). The attested patterns may be quite complex, as simultaneous reduplication may go hand in hand with simple or sidewards reduplication,

and the movement executed by the two hands may be symmetrical or alternating. Wilbur (1987), for instance, notes that in ASL, if a noun is made with one hand at a location on the face, its plural can be realized by repeating the sign alternately with both hands. Simultaneous reduplication may even affect signs that are underlyingly two-handed. Skant et al. (2002) mention that in ÖGS, the plural of a two-handed sign like HIGH-RISE-BUILDING, in which both hands perform a parallel upwards movement, can be expressed by the two hands performing a repeated alternating movement.

Reduplication generally refers to the repetition of (a part of) a stem (e.g. the hypothetical *ba* → *baba* or *bat* → *babat*). However, in nominal plurals in sign language, it is not uncommon for the stem to be repeated more than once, and there may be variation in the number of repetitions (without this variation having semantic consequences). For DGS, Pfau & Steinbach (2006) observed that the most common pattern was triplication (i.e. *ba* → *bababa*), as shown in the videos above. The grammar writer may wish to add a note on the attested variation and the most common pattern. Additionally, in both types of reduplication, simple and sidewards, it may be the case that the noun undergoes phonological changes. There are (at least) two options: (i) the noun's movement is first slightly reduced and then reduplicated; (ii) the first articulation retains its movement but the repeated instance(s) is/are reduced.

Finally, researchers have observed that, even in a sign language that does allow for (different types of) reduplication, it is not necessarily the case that all nouns undergo this process. That is, some nouns are (at least manually) zero-marked, and this option should be included in the grammar. Moreover, if the grammar writer is able to identify phonological factors that block the application of reduplication, then these factors should be described. In DGS, for instance, complex movement and body-anchoredness have been found to block reduplication (Pfau & Steinbach 2006). Consequently, the plural forms of BICYCLE (which has repeated, alternating movement) and PAIR-OF-GLASSES are zero-marked, as shown in the videos below. Note that in NGT, at least some body-anchored nouns can be reduplicated (e.g. the phonologically identical PAIR-OF-GLASSES; Nijhof & Zwitserlood 1999).

4_4.1.1_3b_DGS_BIKE 4_4.1.1_4b_DGS_PAIR-OF-GLASSES

BICYCLE	PAIR-OF-GLASSES	
(intended: 'bicycles')	(intended: 'pairs of glasses')	(DGS)

In the discussion of pluralization, the grammar writer may wish to pay attention to the question whether there is a principled distinction between nouns referring to concrete entities (all of the above) versus abstract entities. For instance, can noun signs like DREAM or THOUGHT be reduplicated? Note that answering this question will be made difficult by the fact that in many sign languages, it will not even be clear whether the signs are nouns or verbs.

Finally, it is, of course, possible that other manual pluralization strategies exist in the sign language under investigation. A noun sign might, for instance, be moved sidewards without reduplication (see Engberg-Pedersen (1993) for Danish SL).

4.1.2 Non-manual marking

The non-manual markers that we describe here may occur by themselves, but they may also combine with the manual strategies described in the previous section. The grammar writer is therefore encouraged to also address the combinatory possibilities. We describe two types of non-manual markers that have been observed to play a role in plural marking: mouthings and head nods. If various types of non-manual marking exist in the sign language, then it might make sense to devote a separate subsection to each type.

In many sign languages, nouns are commonly accompanied by mouthings [Phonology – Section 1.5.2] / mouthings (Boyes Braem & Sutton-Spence 2001). Mouthings may differ depending on whether the sign refers to a single entity or multiple entities. We illustrate some of the attested patterns with examples from Norwegian Sign Language (NSL; Halvorsen et al. 2014). Exceptionally, here we gloss the signs in Norwegian, as the mouthing mirrors the Norwegian word.

The first option is for the mouthing to be lengthened (by lengthening the vowel of the noun). This is observed with the sign GARN ('skein'); in this particular case, the movement is also repeated (as indicated by '++'), and the mouthing extends over the reduplicated form.

/garn/	/gaaaaarn/	
GARN	GARN++	
'skein'	'skein(PL)'	(NSL, Halvorsen et al. 2014)

In the following example, the plural form of PERSON ('person'), which is marked by sideward reduplication (as in the DGS example CHILD above), takes a completely different mouthing, namely *folk*, which means 'people'.

/person/	/folk/	
PERSON	PERSON++	
'person'	'persons/people'	(NSL, Halvorsen et al. 2014)

The NSL noun GUTT ('boy') is a body-anchored noun (articulated at the forehead) and can therefore not be reduplicated. In its plural form, the noun is accompanied by the plural form of the Norwegian noun, marked by the suffix *-er*. That is, in this case, the plural is only marked by the (inflected) mouthing. Halvorsen et al. observe that a plural mouthing may also combine with a reduplicated sign (e.g. in the sign JENTE 'girl').

/gutt/	/gutter/	
GUTT	GUTT	
'boy'	'boys'	(NSL, Halvorsen et al. 2014)

Finally, an interesting pattern described by Halvorsen et al. involves the combination of the non-reduplicated noun sign TIME ('hour') with a mouthed quantifier, in the case below, the quantifier *mange* ('many'). It seems that the resulting complex form is not a "plain" plural. Therefore, such cases, although they can certainly be mentioned in the section on number marking, should rather be discussed in more detail in the section on quantifiers within the noun phrase [Syntax – Section 4.4].

/time/	/mange/	
TIME	TIME	
'hour'	'many hours'	(NSL, Halvorsen et al. 2014)

For LIS, an additional non-manual means of plural marking has been described, which can be used with many body-anchored nouns (which cannot be reduplicated). In the inflected form, "the signer moves his head (at least three times) from left to right, and marks each of these displacements with a head-nod" (Pizzuto & Corazza 1996: 182). However, Pizzuto & Corazza also point out that this non-manual inflection is not obligatory and usually expresses an additional emphatic meaning.

4.2 Localization and distribution

Noun signs, most likely signs that are articulated in neutral signing space, may also be localized in space. Here we distinguish two types of localization.

In the first case, a one- or two-handed singular noun is articulated at a location in the signing space that is not the location of the citation form of the noun. For instance, the symmetrical two-handed noun HOUSE, which in many sign languages would be articulated in a central location in front of the signer (midsaggitally) in its citation form can be displaced towards the ipsi- or contralateral side of the signing space, thereby simultaneously expressing an additional locative meaning ('the house at location x'). Later in the discourse, the location thus introduced can be referred to by means of a pronominal or demonstrative pointing sign or by an agreement or spatial verb (e.g. 'go to the house at location x'). Note that alternative strategies of localizing a noun, namely the use of a locative pointing sign or a classifier adjacent to the noun, should not be discussed in this section, as these are noun phrase internal processes and not instances of nominal inflection.

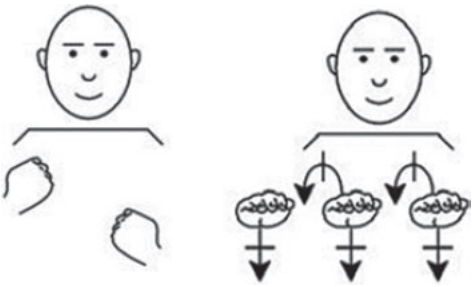
The second type, spatial distribution of a noun, basically combines pluralization and localization. Consider again the noun HOUSE. This noun could also be sequentially repeated at various locations in the signing space, as shown in the video below,

yielding a meaning like 'houses located next to each other'. As for spatial distribution, it might also be worth considering whether one-handed signs can be distributed by using both hands – whether simultaneously or by the two hands in alternation.

4_4.2_1b_DGS_HOUSE-next to each other

$\text{HOUSE}_{\text{left}}$ $\text{HOUSE}_{\text{middle}}$ $\text{HOUSE}_{\text{right}}$
'houses next to each other' (DGS)

As with localization, spatial distribution can also be expressed by alternative strategies, most importantly, by the use of pointing signs or classifiers. The latter strategy is illustrated for the sign CAR in the below figure. In this example, an entity classifier [Morphology – Section 5.1.1] is employed to localize the nominal referent CAR. Again, these strategies should not be discussed in this section, as they do not affect the noun itself.



'cars next to each other' (DGS, Pfau & Steinbach 2006: 163)

For both of the phenomena discussed here, the grammar writer is encouraged to include a note in the grammar on whether localization/distribution of a noun is blocked by certain phonological properties of nouns. It is, for instance, likely that body-anchored nouns cannot be detached from their specified location in order to be articulated in neutral signing space. But other features might also block localization. It might, for instance, turn out that signs with complex alternating movement cannot be localized, even if they are articulated in neutral space in their citation form (like the sign BICYCLE depicted in the previous section).

Elicitation materials

It seems pretty straightforward to elicit the plural form of nouns by means of picture stimuli; for instance, by first presenting a picture of a book (to elicit the base form), and then presenting a picture depicting multiple books (a strategy used, for example,

by Nijhof & Zwitserlood (1999) and Zwitserlood et al. (2012)). However, as already mentioned, there is an important caveat: a picture showing multiple objects will necessarily depict them in a certain configuration, and consequently, the elicited reaction is likely to reflect this configuration. Multiple books, for instance, will either be lying or standing next to each other or lie on top of each other. In other words, such stimuli may be inadequate for eliciting number, but they are appropriate for eliciting localization and distribution.

In order to elicit "pure" plurals, one would need contexts that do not involve spatial localization (e.g. 'My brother loves books', 'Our bikes were stolen'), but such contexts are not easily depicted on pictures. Obviously, the same challenge applies to abstract nouns (e.g. 'idea', 'conflict'). Thus, eliciting the plural of such nouns (or determining the non-existence of a plural form) may require written sentences – clearly a disfavored elicitation strategy – and/or discussions with informants. In addition, corpus data, if available, may be informative.

References

Main sources on nominal inflection in sign languages:

Engberg-Pedersen, E. 1993. *Space in Danish Sign Language. The semantics and morphosyntax of the use of space in a visual language*. Hamburg: Signum.

Halvorsen, R.P., O.-I. Schröder, B. Barman Wold & B. Schröder. 2014. *Noun and plural constructions in Norwegian Sign Language*. Manuscript.

Nijhof, S. & I. Zwitserlood. 1999. Pluralization in Sign Language of the Netherlands (NGT). In J. Don & T. Sanders (eds.), *OTS Yearbook 1998–1999*, 58–78. Utrecht: UiL OTS.

Özyürek, A., I. Zwitserlood & P. Perniss. 2010. Locative expressions in signed languages: A view from Turkish Sign Language (TİD). *Linguistics* 48(5). 1111–1145.

Pfau, R. & M. Steinbach. 2005. Plural formation in German Sign Language: Constraints and strategies. In H. Leuninger & D. Happ (eds.), *Gebärdensprachen: Struktur, Erwerb, Verwendung* (*Linguistische Berichte* Special Issue 15), 111–144. Hamburg: Buske.

Pfau, R. & M. Steinbach. 2006. Pluralization in sign and in speech: A cross-modal typological study. *Linguistic Typology* 10. 135–182.

Pizzuto, E. & S. Corazza. 1996. Noun morphology in Italian Sign Language. *Lingua* 98. 169–196.

Stavans, A. 1996. One, two, or more: the expression of number in Israeli Sign Language. In W.H. Edmondson & R.B. Wilbur (eds.), *International review of sign linguistics*, 95–114. Mahwah, NJ: Erlbaum.

Zwitserlood, I., P. Perniss & A. Özyürek. 2012. An empirical investigation of expression of multiple entities in Turkish Sign Language (TİD): Considering the effects of modality. *Lingua* 122. 1636–1667.

Zwitserlood, I., P. Perniss & A. Özyürek. 2013. Expression of multiple entities in Turkish Sign Language (TİD). In E. Arık, (ed.), *Current directions in Turkish Sign Language research*, 273–302. Newcastle upon Tyne: Cambridge Scholars Publishing.

General sources on nominal inflection:

Corbett, G.G. 2000. *Number*. Cambridge: Cambridge University Press.

Chapter 5 Classifiers

5.0 Definitions and challenges

5.0.1 What are classifiers?

Classifiers are morphological categories that denote entities (both animate and inanimate) by depicting some salient iconic aspect of these entities by manual articulation, in particular, handshape (see the discussion of classifiers in the Semantics Part [Semantics – Chapter 7]). They occur in combination with verbs (or rather verb stems) expressing motion and location. The relevant property that determines the form of the classifier may be the three-dimensional depiction of the shape of an object (e.g. the hand representing a round item by assuming that shape), a two- or three-dimensional depiction of the outline of an object (e.g. the index finger tracing the outline of a mirror), or the depiction of an object's movement while it is handled or manipulated by a hand (e.g. while using a particular tool). Classifiers are part of the non-core lexicon [Lexicon – Section 1.2] of sign languages and are found – albeit to varying degrees and with various lexical differences – in every sign language studied to date.

5.0.2 Phonological and morpho-syntactic characteristics of classifiers

Classifiers in sign languages generally occur in combination with verbs, and only with verbs of motion or location (Zwitserlood 2003). They are used with predicates indicating a referent's motion through space, a change of posture, and the location or existence of a referent somewhere in the signing space. They also indicate a referent by the handshape that is involved in handling that referent (e.g. the handshape depicting the shape of the hand while holding a book). Classifiers combine with verb stems that are unspecified for handshape. Morphologically, they can thus be considered as bound morphemes; they have to combine with another item, and forms that contain classifiers are thus polymorphemic.

Phonologically, the resulting form, the verbal complex made up of a classifier and a verb, is usually monosyllabic [Phonology – Section 2.1.1]. Classifiers may involve an orientation feature, but they lack movement features (the movement features seen in classifier constructions represent a feature of the verb). Only a subgroup of classifiers, Size-and-Shape Specifiers, involve movement, not to represent the motion or location of an entity, but rather to represent the existence and the size and shape of that entity.

Semantically, classifiers [Semantics – Chapter 7] are underspecified, in that they refer to an iconic property of a particular entity by referring to a property of the class of similar entities, thus they are pronominal items (proforms).

5.0.3 Terminology and classification

The term "classifier" has originally been used for morphemes in spoken languages that distinguish classes of nouns from each other (on a par with the inflectional notion of grammatical gender; e.g. Allen (1977), see also Aikhenvald (2000) for an overview). For the sake of illustration, we provide one example from Caddo (Southeastern US). Caddo employs predicate classifiers which attach to the verb stem and which classify the object according to certain physical/shape properties. As is evident from the example, it is only the classifier (CL) that disambiguates the meaning.

a. Kapí: **kan**-čâ:ni'ah
   coffee CL_{liquid}-buy.PAST
   'He bought (liquid) coffee.'
b. Kapí: **dân:**-čâ:ni'ah
   coffee CL_{powder}-buy.PAST
   'He bought (ground) coffee.' (Caddo, Mithun 1986: 386)

The term "classifier" was first introduced into sign linguistics by Frishberg (1975). The term is generally used in the literature to refer to classifier handshapes, while the predicates these handshapes combine with are referred to as "classifier predicates/verbs". However, various other terms for verb-classifier combinations have been used in the literature, including "depicting verbs" (Liddell 2003), spatial-locative predicates, polymorphemic predicates/verbs of motion/location, polysynthetic signs, polycomponential verbs, and productive signs (Schembri 2003). This multitude of terms is also due to the fact that the exact nature of classifiers is still debated among sign linguists, with analyses ranging from gestural to inflectional elements. In the following, we will stick to the terms "classifier" and "classifier predicate", but the grammar writer is, of course, free to adopt other terminology. Independent of the terminology chosen, it is suggested to treat classifiers separately in the grammar, rather than including them as a subsection within any of the previous chapters (compounding, derivation, inflection) – especially given the lack of consensus in the literature concerning their status.

Beyond these terminological and analytical issues, different types of classifications have been suggested by different researchers, the most detailed one being the one by Supalla (1986, 1990) (see Schembri (2003) and Zwitserlood (2012) for overviews). Below we present four types of classifiers that are known to occur in almost every sign language, and we use terms that are fairly common in the literature: entity classifiers, bodypart classifiers, handle classifiers, and Size-and-Shape Specifiers. However, the grammar writer may wish to adopt another classification or other terms.

5.0.4 Comparison with classifiers in spoken languages

The elements that are commonly referred to as "classifier" in sign language linguistics share some properties with classifiers in spoken languages (see Zwitserlood (2012) for discussion). In particular, both refer to classes of objects, based on certain semantic characteristics. For example, a particular Bantu language (a language group that typically has a large number of classifiers) may have a classifier for nouns denoting sharp objects, another one for bony entities, and another one for flat objects, etc. Another similarity is that classifiers in spoken languages are generally bound morphemes (see the Caddo example above), just like classifiers in sign languages.

These similarities notwithstanding, however, not all scholars agree that the two phenomena are sufficiently similar to justify a comparison, and by implication, the use of the same label (e.g. Schembri 2003). For instance, classifiers in spoken languages are often used as concord (i.e. they also appear on adjectives, determiners, etc.), while classifiers in sign languages group nouns in terms of certain iconic (visual) characteristics. Also, in sign languages, it is not uncommon for a classifier to refer to different *kinds* of entities in different contexts (for instance, a ☝-handshape referring to a person or a pen). This also explains why some authors prefer to use a different label for predicates that may undergo a handshape change based on one of their arguments (as described above).

5.0.5 Methodological challenges

The form of a particular classifier may be variable since classifiers [Lexicon – Section 1.2.1] are part of the non-core lexicon. As classifiers are based on the iconic similarity of the shape of an entity or action, their shape may vary from one context to another, albeit within certain limits. There are also differences in lexicalization and grammaticalization depending on the age of the sign language (Aronoff et al. 2003). A related issue which makes the analysis difficult is that a classifier may be identical to (a) a lexeme and (b) a gesture. For example, the lexeme for 'knife' may be used as a classifier for all cutting objects, and within the same sentence, the same form may be used as a classifier or as a lexicalized expression. Similarly, a classifier and a gesture may have the same form. Thus the grammar writer has to determine whether a particular form is truly a classifier. However, since classifiers may not be obligatory, their syntactic distribution is not easy to determine.

Secondly, the class of entities denoted by a classifier may not be strictly definable. A particular entity may be associated with a particular classifier on the fly. Thirdly, the grammatical category of a classifier may not be straightforward. Some researchers consider classifiers as (inflectional) agreement markers, others as valency changers. Next, there is variability in the choice of classifier, concomitant with their inclusion in the non-core lexicon.

Assignment of classifiers to a specific type may pose an additional methodological challenge. Some scholars, for instance, include whole body classifiers, which are articulated by the whole (upper) body rather than the hand(s), in the group of entity classifiers. It may at times be difficult to draw a line between whole body and bodypart classifiers. Similarly, there is overlap between static Size-and-Shape Specifiers, which represent the outline of the whole of the referent, and whole entity classifiers (e.g. a  -handshape representing a button on a shirt). Handle classifiers, similarly, may show overlap with the other groups.

The distinction between different types of classifiers is based on their syntactic functions and not on their semantics (see the discussion of classifiers in the Semantics Part [Semantics – Chapter 7]). A particular entity (e.g. a book) can be expressed by an entity classifier (flat hand) in the sentence 'There are books in the bookcase', while the same entity can be expressed by a handling classifier in the sentence 'I took a book from the shelf'. Moreover, in most sign languages, signers can use different classifiers to focus or defocus different parts of the same entity. The grammar writer should be aware of such overlaps and differences and decide on each particular case after analyzing all the classifiers in the language.

Finally, it is important to point out that Size-and-Shape-Specifiers as a group behave differently from the other classifier types, as they do not combine with predicates but rather function (in most cases) as nominal modifiers that resemble adjectives. The grammar writer might therefore decide to treat Size-and-Shape-Specifiers not as a morphological phenomenon but rather as a lexical category and thus include them in the section on adjectives [Lexicon – Section 3.4].

5.1 Predicate classifiers

5.1.1 Entity classifiers

Entity classifiers (or whole entity classifiers) may refer to inanimate or animate objects. Some examples of whole entity classifier handshapes that are common across sign languages are the  -handshape (for objects with smooth flat surfaces, e.g. a sheet of paper or a book), the  -handshape (for long and/or thick cylindrical objects, e.g. a cup or a tree), and the  -handshape (for long, thin objects, e.g. a pen or a person). They occur in verbs that express a motion of a referent, its localization in space, or its existence in space, and are combined with the phonological motion feature of the verb. When the predicate expresses the location of an entity, it usually includes a short movement towards a plane, as, for instance, in the example below, where the relevant plane is the horizontal plane representing the table. The  -handshape represents a glass (which is not explicitly mentioned in this example).

TABLE MILK BE-LOCATED (NGT)

'A glass of milk is on (top of) the table.'

When the predicate expresses the movement of an entity, then there is usually a wider choice of movement shapes (e.g. straight, zigzag, circle) that can be executed on various planes. In the following example, movement of the 🤌-handshape (representing a car) proceeds on an angular plane. (Note that in the gloss, we choose to represent the classifier predicate as MOVE-UP, combined with a morpheme for the classifier handshape. However, in the literature, various strategies are used for glossing such predicates. The glosses below do not include the information that the palm of the hand is oriented downward.)

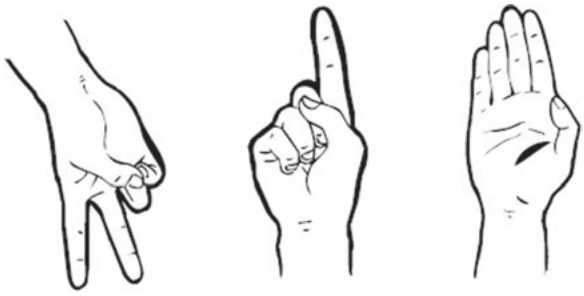
HILL CAR MOVE-UP-CL:🤌
'A car moves/drives up a hill.' (NGT)

In both types of verbs, the classifiers represent the referent directly; in a sense, the handshape *is* the referent. Whole entity classifiers combine with intransitive verbs; these verbs have a single internal argument that receives the thematic role patient (the glass and the car, respectively, in the examples above), thus they are unaccusative [Syntax – Section 2.1.1.2] / unaccusative verbs.

The grammar writer should strive to inventory the classifier handshapes that combine with verbs of location and motion in the sign language. It is likely that most of the handshapes identified may combine with both types of verbs – but this is not necessarily the case. Providing an inventory of attested entity classifiers is informative, as it has been shown that sign languages differ from each other with respect to the number and forms used. For instance, Zwitserlood (2003) identified 15 entity classifiers for NGT, while Bauer (2014) found only three entity classifiers in Yolngu SL, and these were quite specific, referring to legged entities, a didgeridoo (*yidaki*), and boats (note that the first one will actually be classified as a bodypart classifier below). We suggest that the grammar writer present the entity classifiers in the form of a handshape chart. As an inspiration, we provide an excerpt of a table from Zwitserlood (2003), as well as a figure showing the Yolngu SL entity classifiers identified by Bauer (2014). Note that Zwitserlood also specifies the classes of objects a classifier handshape may refer to, and the grammar writer may wish to adopt a similar strategy.

Table Morphology-5: A selection of handshapes used in entity classifiers in NGT (Zwitserlood 2003: 138)

EC	**flat and wide entities**: books, sheets of paper, walls, table tops, cars, bicycles, trains, helicopters, flying saucers, CD-ROM discs, circles, squares
EC	**long and narrow entities**: poles, pens, knives, toothbrushes, branches, trees **animate entities:** humans, animals
EC	**3D round entities**: balls, apples, tomatoes, stones
EC	**(3D) entities:** squares, circles



legged entity yidaki boat (YSL, Bauer 2014: 197)

Finally, it is worth noting that Nyst (2007) found that Adamorobe SL does not make use of entity classifiers at all – except for a few cases in which a classifier is used to indicate the location of an entity on the signer's body. Movement predicates, however, never combine with entity classifier handshapes. Rather, AdaSL employs what she calls "generic directionals", movement predicates with unmarked, lax handshapes that do not reflect any shape characteristics of the moving entity.

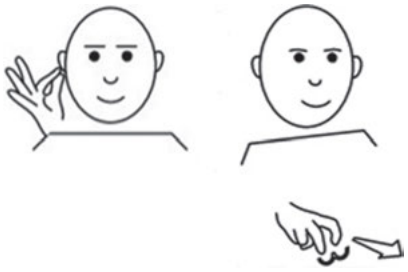
5.1.2 Bodypart classifiers

The Yolngu SL chart in the previous section illustrates that bodypart classifiers (also referred to as limb/body part classifiers) are sometimes subsumed under entity

classifiers. While it is true that they also refer to entities, they don't refer to entities as a whole but rather to parts of a human or animal body, mostly limbs, expressed, for instance, by a -handshape or a hooked -handshape for legs or two -handshapes for feet. Just like entity classifiers, bodypart classifiers may express the location or movement of entities, as shown in the examples below.

CHAIR CAT BE-LOCATED (NGT)

'A cat is sitting on a chair.'



WOMAN WALK (DGS)

'The woman walks.'

Other bodypart classifiers may refer to the head of an animate being (e.g. the -handshape in the verb BOW), to the mouth, or even to the eyelids. In the following ASL example, the - or -handshape represents at the same time the head and the horns of the cow, and it shows how the body part is moving (bowing).

COW HORNS+BOW

'The cow bowed its head.' (ASL, Grose et al. 2007: 1275)

Note that bodypart classifiers sometimes function like entity classifiers. In the 'cat'-example above, for instance, the bodypart classifier represents the whole cat, despite the fact that only her legs are represented by the handshape. In this sense, it functions pretty much like the -handshape in the 'glass'-example in the section on

entity classifiers. Still, the (iconic) feature represented by the handshape is clearly different in both types of classifiers.

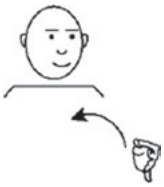
In addition, researchers have argued that the morphosyntactic properties of bodypart classifiers are different from those of entity classifiers. Just like entity classifiers, they combine with intransitive predicates (e.g. WALK, SIT, BOW), but these predicates are unergative [Syntax – Section 2.1.1.2] / unergative, that is, they have a single external argument to which the thematic role agent is assigned (Benedicto & Brentari (2004); but see Grose et al. (2007) for an alternative view), and it therefore makes sense to present them separately from the entity classifiers. Still, the grammar writer may wish to present these two classifier types within one section of the grammar, given that they differ as a group from the handle classifiers discussed in the next section.

As in the previous section, the grammar should include a table or figure charting the attested bodypart classifiers.

5.1.3 Handle classifiers

Handle (or handling) classifiers occur with verbs that involve the holding or the manipulated motion of a referent. In contrast to entity [Morphology – Section 5.1.1] and bodypart classifiers [Morphology – Section 5.1.2], they represent the entity they refer to indirectly, as they represent only the part of the object that is handled, for example, the stem of a flower, the handle of a basket, or the handle of a knife. In other words, they encode an iconic aspect associated with an action involving the theme of a verb, but they do not reflect the characteristics of the theme per se. Sometimes the theme is simply an object that is being held or transferred (e.g. given to someone). However, the theme may also exert force or may have some other effect on another object; in this case, scholars sometimes speak of "instrument" classifiers (e.g. handling a hammer, key, or toothbrush). Still, the classifier handshape reflects how the instrument is handled, and in this sense, instrument classifiers are a subtype of handle classifiers. It is up to the grammar writer to decide whether s/he wants to discuss instrument classifiers separately – within this section or in a separate section. This might make sense, for instance, if it turns out that some handshapes are used only as instrument classifiers.

Obviously, one and the same object may fulfill both functions. A hammer, for instance, can be given to someone or be used as an instrument – and in both cases, the predicate would combine with the  -handshape. Other attested handle classifiers include the  -handshape for cylindrical objects and the  -handshape for long and thin objects (e.g. a flower or pen), as in the example below, where the classifier actually indicates that the cup is picked up by the handle.



'(Someone) picks up a teacup (by the handle).' (NGT, Zwitserlood 2003: 100)

Since handle classifiers reflect properties of a theme argument, and since handling or manipulating an object always implies an agent, it follows that handle classifiers, in contrast to entity and bodypart classifiers, combine with transitive [Syntax – Section 2.1.1.1] / transitive verbs (Benedicto et al. 2007).

Depending on the size of the handled object, handle classifiers may be one- or two-handed. Some of the examples mentioned above make clear that one and the same object may be reflected by different handshapes depending on whether it appears in an intransitive or transitive clause, that is, whether it triggers the use of an entity/bodypart or handle classifier. For instance, a pen would be represented by a -handshape in sentence (a), but by a -handshape in sentence (b). (An exception to this, in many sign languages, is the classifier handshape for cylindrical objects, which is identical for entity and handle classifiers.)

a. TABLE PEN BE-LOCATED-CL: → entity CL
'A pen is lying on the table.' (NGT)

b. FRIEND INDEX$_3$ PEN $_1$GIVE$_3$-CL: → handle CL
'I give my friend a pen.' (NGT)

As in the previous sections, this section of the grammar should include an overview of the attested handle classifiers (with the subtype instrument classifiers being included in this chart or presented separately). Below we present an excerpt from a table provided by Zwitserlood (2003).

Table Morphology-6: A selection of handshapes used in handle classifiers in NGT (Zwitserlood 2003: 139)

	HC	**3D round/cylindrical entities**: glasses, mugs, apples, balls, poles, circles, trees **small/flat entities (compared to shape of manipulator)**: clothes, feet, books
	HC	**small/thin entities**: pins, pens, handkerchiefs, buttons, cups (by handle)
	HC	**flat entities**: piles of paper, towels, books

5.2 Size-and-Shape Specifiers

As the name says, Size-and-Shape-Specifiers (SASS) express the size and shape of entities. SASS come in two types: static SASS and tracing SASS.

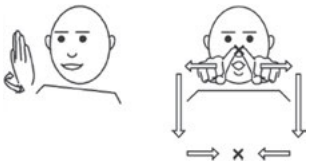
Static SASS are handshapes that indicate classes of objects with a particular shape. Often the handshape reflects (part of) the outline of the object, as in examples (a) and (b) below, but in principle, it may also be the surface of the hand that reflects the size and the shape of the object, as in (c).

a. b. c.

'square object' 'small round object' 'wide flat object' (NGT)

As already pointed out under "Methodological challenges" [Morphology – Section 5.0.5], static SASS are very similar to entity classifiers. This is particularly evident for the handshape (c), which, in many sign languages, is considered to be the entity classifier for flat objects (e.g. books, cars). The only difference between the static SASS in (a) and (b) and most entity classifiers is that the SASS represent an entity by means of its outline – but the same is actually true for the entity classifier for cylindrical objects discussed above. Consequently, some scholars do indeed subsume static SASS under entity classifiers (e.g. Zwitserlood 2003). The grammar writer may decide to follow this line of reasoning and include static SASS in the section on entity classifiers.

Things are different for the second type, the tracing SASS, as these involve a movement component by which the outline of the object is traced. As also pointed out in the section "Methodological challenges", one important property that sets these apart from entity, bodypart, and handle classifiers is that they do not combine with verbs to form morphologically complex predicates. Rather they accompany nouns within a noun phrase and thus function more like adjectives (also, they may combine with a noun within a compound [Morphology – Section 1.1.1.3]; e.g. SWIM $SASS_{square}$ 'swimming pool'). In addition, they can, in principle, be of any shape. Consider the following example for illustration.



MIRROR $SASS_{square}$ (LIS, Baker & Pfau 2016: 104)

'a square mirror'

If the sign language under investigation does have SASS, then it will probably be unnecessary (if not impossible) to provide a list of all the SASS attested. It may, however, be worth investigating whether the sign language allows for different handshapes in order to specify the depth of the object the outline of which is traced. For instance, when tracing a rectangular shape, the signer might use a  -handshape to indicate a 2-dimensional object (e.g. a sheet of paper) or a  -handshape to indicate a 3-dimensional object (e.g. a box).

Remember, however, that this whole section might not appear if the grammar writer decides to address static SASS under entity classifiers and tracing SASS within the section on adjectives [Lexicon – Section 3.4] in the Lexicon Part. The header "Predicate classifiers" will then become unnecessary, and the sections on entity, bodypart, and handle classifiers will get second-level headers.

Elicitation materials

In order to elicit different types of classifiers, researchers have used pictures, picture stories, and short video clips (e.g. cartoons). Zwitserlood (2003), for instance, used pictures of static and moving entities, including non-existent entities (e.g. a three-legged alien, a flying dog, etc.) to elicit entity classifiers. Various objects that are known to be depicted by classifiers in sign languages (round objects, instruments, entities of various shapes) as well as human and animal figurines (e.g. made by legos; see Perniss 2007) can be placed in various locations, moved around, etc. Informants can be asked to describe the location and movement of these objects. Descriptions of different people wearing different garments and having different physical attributes may generate SASS. Pictures of novel objects that can only be identified by visual description, likewise, can generate SASS. Films containing such objects can be shown to informants who can then be asked to describe what they have seen in the film. These can include people handling different objects and interacting with each other (as, for instance, the German TV *Sendung mit der Maus* cartoons used by Perniss (2007)). The picture story *Frog, where are you* as well as the famous animated *Canary Row* cartoons have been used with various sign languages to elicit classifiers.

References

Main sources on classifiers in sign languages:

Benedicto, E. & D. Brentari. 2004. Where did all the arguments go? Argument changing properties of classifiers in American Sign Language. *Natural Language and Linguistic Theory* 22. 743–810.

Emmorey, K. (ed.). 2003. *Perspectives on classifier constructions in sign languages*. Mahwah, NJ: Lawrence Erlbaum.

Morgan, G. & B. Woll (eds.). 2007. *The linguistics of sign language classifiers: phonology, morpho-syntax, semantics, and discourse. Lingua* Special Issue 117(7).

Oviedo, A. 2004. *Classifiers in Venezuelan Sign Language*. Hamburg: Signum.
Schembri, A. 2003. Rethinking 'classifiers' in signed languages. In K. Emmorey (ed.), *Perspectives on classifier constructions in sign languages*, 3–34. Mahwah, NJ: Lawrence Erlbaum.
Supalla, T. 1986. The classifier system in American Sign Language. In C. Craig (ed.), *Noun classes and categorization*, 181–214. Amsterdam: John Benjamins.
Zwitserlood, I. 2003. *Classifiying hand configurations in Nederlandse Gebarentaal*. University of Utrecht PhD dissertation. Utrecht: LOT.
Zwitserlood, I. 2012. Classifiers. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 158–186. Berlin: De Gruyter Mouton.

General sources on classifiers:

Aikhenvald, A.Y. 2000. *Classifiers: A typology of noun categorization devices*. Oxford: Oxford University Press.
Allan, K. 1977. Classifiers. *Language* 53(2). 285–311.
Craig, C.G. 1992. Classifiers in a functional perspective. In M. Fortescue, P. Harder & L. Kristoffersen (eds.), *Layered structure and reference in a functional perspective*, 277–301. Amsterdam: John Benjamins.
Mithun, M. 1986. The convergence of noun classification systems. In C. Craig (ed.), *Noun classes and categorization*, 379–397. Amsterdam: John Benjamins.

Complete list of references – Morphology

Abner, N. In press. What you see is what you get.get: Surface transparency and ambiguity of nominalizing reduplication in American Sign Language. To appear in *Syntax*.

Aikhenvald, A.Y. 2000. *Classifiers: A typology of noun categorization devices*. Oxford: Oxford University Press.

Allan, K. 1977. Classifiers. *Language* 53(2). 285–311.

Anderson, L.B. 1982. Universals of aspect and parts of speech: Parallels between signed and spoken languages. In P.J. Hopper (ed.), *Tense – aspect: Between semantics and pragmatics*, 91–114. Amsterdam: John Benjamins.

Aronoff, M., I. Meir, C. Padden & W. Sandler 2003. Classifier constructions and morphology in two sign languages. In K. Emmorey (ed.), *Perspectives on classifier constructions in sign languages*, 52–84. Mahwah, NJ: Lawrence Erlbaum.

Aronoff, M., I. Meir & W. Sandler. 2005. The paradox of sign language morphology. *Language* 81(2). 301–344.

Bahan, B., J. Kegl, R.G. Lee, D. MacLaughlin & C. Neidle. 2000. The licensing of null arguments in American Sign Language. *Linguistic Inquiry* 31(1). 1–27.

Baker, A. & R. Pfau. 2016. Constituents and word classes. In Baker, A., B. van den Bogaerde, R. Pfau & T. Schermer (eds.), *The linguistics of sign languages: An introduction,* 93–115. Amsterdam: John Benjamins.

Baker-Shenk, C. & D. Cokely (eds.). 1980. *American Sign Language: A teacher's resource text on grammar and culture.* Chicago, IL: Gallaudet University Press.

Bank, R. 2014. *The ubiquity of mouthings in NGT. A corpus study*. Radboud University Nijmegen PhD dissertation. Utrecht: LOT.

Bat-El, O. 2006. Blend. In K. Brown (ed.), *Encyclopedia of language and linguistics 2nd edition* (Vol. 2), 66–70. Oxford: Elsevier.

Battison, R.M. 1978 [2003]. *Lexical borrowing in American Sign Language:* Burtonsville, MD: Linstok Press.

Bauer, A. 2014. *The use of space in a shared sign language of Australia*. Berlin & Nijmegen: De Gruyter Mouton & Ishara Press.

Bauer, L. 2006. Compound. In K. Brown (ed.), *Encyclopedia of language and linguistics, Vol. 2* (2nd edition), 719–726. Oxford: Elsevier.

Bellugi, U. 1980. How signs express complex meanings. In C. Baker & R. Battison (eds.), *Sign language and the deaf community*, 53–74. Silver Spring, MD: NAD.

Benedicto, E. & D. Brentari. 2004. Where did all the arguments go? Argument changing properties of classifiers in American Sign Language. *Natural Language and Linguistic Theory* 22. 743–810.

Benedicto, E., S. Cvejanov & J. Quer. 2007. Valency in classifier predicates: A syntactic analysis. *Lingua* 117(7). 1202–1215.

Bergman, B. 1995. Manual and nonmanual expression of negation in Swedish Sign Language. In H. Bos & T. Schermer (eds.), *Sign Language research 1994: Proceedings of the Fourth European Congress on Sign Language Research*, 85–103. Hamburg: Signum.

Bergman, B. & Ö. Dahl. 1994. Ideophones in sign language? The place of reduplication in the tense-aspect system of Swedish Sign Language. In C. Bache, H. Basbøll, & C.-E. Lindberg (eds.), *Tense, aspect and action: Empirical and theoretical contributions to language typology*, 397–422. Berlin: Mouton de Gruyter.

Bergman, B. & L. Wallin. 2003. Noun and verbal classifiers in Swedish Sign Language. In K. Emmorey (ed.), *Perspectives on classifier constructions in sign languages*, 35–51. Mahwah, NJ: Lawrence Erlbaum.

Binnick, R.I. (ed.). 2012. *The Oxford handbook of tense and aspect*. Oxford: Oxford University Press.

Blakemore, D. (1994). Evidence and modality. In R.E. Asher (ed.), *The encyclopedia of language and linguistics*, 1183–1186. Oxford: Pergamon Press.
Bobaljik, J.D. & S. Wurmbrand. 2002. Notes on agreement in Itelmen. *Linguistic Discovery* 1(1).
Boyes Braem, P. & R. Sutton-Spence (eds.). 2001. *The hands are the head of the mouth: The mouth as articulator in sign languages*. Hamburg: Signum.
Brennan, M. 1990. *Word formation in British Sign Language.* Stockholm: University of Stockholm.
Brennan, M. 1983. Marking time in British Sign Language. In J. Kyle & B. Woll (eds.), *Language in sign*, 10–31. London: Croom Helm.
Brentari, D. 1998. *A prosodic model of sign language phonology*. Cambridge, MA: The MIT Press.
Brentari, D. & C. Padden. 2001. Native and foreign vocabulary in American Sign Language: A lexicon with multiple origins. In D. Brentari (ed.), *Foreign vocabulary in sign languages*, 87–119. Mahwah, NJ: Lawrence Erlbaum.
Bybee, J. & S. Fleischman. 1995. Modality in grammar and discourse. An introductory essay. In J. Bybee & S. Fleischman (eds.), *Modality in grammar and discourse*, 1–14. Amsterdam: John Benjamins.
Bybee, J., R. Perkins & W. Pagliuca. 1994. *The evolution of grammar: tense, aspect and modality in the languages of the world.* Chicago, IL: University of Chicago Press.
Chomsky, N. 1968. *Language and mind*. Cambridge, MA: The MIT Press.
Cogen, C. 1977. On three aspects of time expression in American Sign Language. In L.A. Friedman (ed.), *On the other hand: New perspectives on American Sign Language,* 197–214. New York: Academic Press.
Comrie, B. 1976. *Aspect. An introduction to the study of verbal aspect and related problems.* Cambridge: Cambridge University Press.
Comrie, B. 1985. *Tense.* Cambridge: Cambridge University Press.
Corbett, G.G. 2000. *Number*. Cambridge: Cambridge University Press.
Corbett, G.G. 2006. *Agreement.* Cambridge: Cambridge University Press.
Costello, Brendan. 2015. *Language and modality: Effects of the use of space in the agreement system of lengua de signos española (Spanish Sign Language)*. University of Amsterdam & University of the Basque Country PhD dissertation.
Craig, C.G. 1992. Classifiers in a functional perspective. In M. Fortescue, P. Harder & L. Kristoffersen (eds.), *Layered structure and reference in a functional perspective*, 277–301. Amsterdam: John Benjamins.
Dahl, Ö. 1985. *Tense and aspect systems.* Oxford: Blackwell.
Dahl, Ö. 2011. Typology of negation. In L.R. Horn (ed), *The expression of negation*, 9–38. Berlin: De Gruyter Mouton.
De Beuzeville, L., T. Johnston & A. Schembri. 2009. The use of space with indicating verbs in Auslan: A corpus-based investigation. *Sign Language & Linguistics* 12(1). 53–82.
Dikyuva, H. 2011. *Aspectual non-manual expressions in Turkish Sign Language (TİD)*. University of Central Lancashire MA thesis.
Eccarius, P. & D. Brentari. 2007. Symmetry and dominance: A cross-linguistic study of signs and classifier constructions. *Lingua* 117(7). 1169–1201.
Emmorey, K. (ed.). 2003. *Perspectives on classifier constructions in sign languages*. Mahwah, NJ: Lawrence Erlbaum.
Engberg-Pedersen, E. 1993. *Space in Danish Sign Language. The semantics and morphosyntax of the use of space in a visual language*. Hamburg: Signum Verlag.
Evans, N., S.C. Levinson, N.J. Enfield, A. Gaby & A. Majid. 2004. Reciprocal constructions and situation type. In A. Majid (ed.), *Field manual volume 9*, 25–30. Nijmegen: Max Planck Institute for Psycholinguistics.

Fabb, N. 2001. Compounding. In A. Spencer & A. Zwicky (eds.), *The handbook of morphology*, 67–83. Oxford: Blackwell.
Fernald, T.B. & D.J. Napoli. 2000. Exploitation of morphological possibilities in signed languages: Comparison of American Sign Language with English. *Sign Language & Linguistics* 3(1). 3–58.
Fischer, S.D. 1973. Two processes of reduplication in the American Sign Language. *Foundations of Language* 9. 469–480.
Fischer, S.D. & B. Gough. 1999 [1972]. Some unfinished thoughts on FINISH. *Sign Language & Linguistics* 2(1). 67–77.
Ferreira-Brito, L. 1990. Epistemic, alethic, and deontic modalities in a Brazilian Sign Language. In S.D. Fischer & P. Siple (eds.), *Theoretical issues in sign language research. Vol. 1: Linguistics,* 229–260. Chicago: University of Chicago Press.
Frishberg, N. 1975. Arbitrariness and iconicity: Historical change in American Sign Language. *Language* 51. 696–719.
Grose, D.R. 2003. *The perfect tenses in American Sign Language: Nonmanually marked compound tenses*. Purdue University MA thesis.
Grose, D., R.B. Wilbur & K. Schalber. 2007. Events and telicity in classifier predicates: A reanalysis of body part classifier predicates in ASL. *Lingua* 117(7). 1258–1284.
Haan, F. de. 2006. Typological approaches to modality. In W. Frawley (ed.), *The expression of modality*, 27–69. Berlin: Mouton de Gruyter.
Halvorsen, R.P., O.-I. Schröder, B. Barman Wold & B. Schröder. 2014. Noun and plural constructions in Norwegian Sign Language. Manuscript.
Happ, D. & M.-O. Vorköper. 2006. *Deutsche Gebärdensprache. Ein Lehr- und Arbeitsbuch*. Frankfurt: Fachhochschulverlag.
Herrmann, A. 2013. *Modal and focus particles in sign languages. A cross-linguistic study*. Berlin/ Nijmegen: De Gruyter Mouton/Ishara Press.
Hoiting, N. & D.I. Slobin. 2001. Typological and modality constraints on borrowing: Examples from the Sign Language of the Netherlands. In D. Brentari (ed.), *Foreign vocabulary in sign languages. A cross-linguistic investigation of word formation*, 121–137. Mahwah, NJ: Erlbaum.
Horn, L. 1989. *A natural history of negation*. Chicago: University of Chicago Press.
Hunger, B. 2006. Noun/verb pairs in Austrian Sign Language (ÖGS). *Sign Language & Linguistics* 9(1/2). 71–94.
Jacobowitz, E.L. & W.C. Stokoe. 1988. Signs of tense in ASL verbs. *Sign Language Studies* 60. 331–339.
Janis, W.D. 1995. A crosslinguistic perspective on ASL verb agreement. In Emmorey, K. & J. Reilly (eds.), *Language, gesture, and space,* 195–223. Hillsdale: Erlbaum.
Janzen, T. 1995. *The poligrammaticalization of FINISH in ASL*. University of Manitoba, Winnipeg, MA thesis.
Johnston, T. 2001. Nouns and verbs in Australian Sign Language: An open or shut case? *Journal of Deaf Studies and Deaf Education* 6(4). 235–257.
Karabüklü, S. In progress. *On perfective sign in Turkish Sign Language*. Boğaziçi University, Istanbul, MA thesis.
Kimmelman, V. 2009. Parts of speech in Russian Sign Language: the role of iconicity and economy. *Sign Language & Linguistics* 12(2). 161–186.
Klein, W. 1994. *Time in language*. London: Routledge.
Klima, E. & U. Bellugi. 1979. *The signs of language*. Cambridge, MA: Harvard University Press.
Ktejik, M. 2013. Numeral incorporation in Japanese Sign Language. *Sign Language Studies* 13(2). 186–210.
Kratzer, A. 1991. Modality. In A. von Stechow & D. Wunderlich (eds.), *Semantics: An international handbook of contemporary research,* 639–650. Berlin: Walter de Gruyter.
Lackner, A. 2013. *Linguistic functions of head and body movements in Austrian Sign Language (ÖGS). A corpus-based analysis*. University of Graz PhD dissertation.

Lakoff, G. & M. Johnson. 1980. *Metaphors we live by*. Chicago: University of Chicago Press.
Leuninger, H. 2001. Das Projekt RELEX: Ein ökumenisches Lexikon religiöser Gebärden. In H. Leuninger & K. Wempe (eds.), *Gebärdensprachlinguistik 2000: Theorie und Anwendung*, 171–192. Hamburg: Signum.
Lewin, D. & A. Schembri. 2011. Mouth gestures in British Sign Language: A case study of tongue protrusion in BSL narratives. *Sign Language & Linguistics* 14(1). 94–114.
Liddell, S.K. 1984. Unrealized inceptive aspect in American Sign Language: Feature insertion in syllabic frames. In J. Drogo, V. Mishra & D. Testen (eds.), *Papers from the 20th Regional Meeting of the Chicago Linguistic Society,* 257–270. Chicago: University of Chicago Press.
Liddell, S.K. 1997. Numeral incorporating roots & non-incorporating prefixes in American Sign Language. *Sign Language Studies* 92. 201–225.
Liddell, S.K. 2000. Indicating verbs and pronouns: Pointing away from agreement. In K. Emmorey & H. Lane (eds.), *The signs of language revisited: An anthology to honor Ursula Bellugi and Edward Klima*, 303–320. Mahwah, NJ: Erlbaum.
Liddell, S.K. 2003. *Grammar, gesture, and meaning in American Sign Language*. Cambridge: Cambridge University Press.
Liddell, S.K. & R.E Johnson. 1986. American Sign Language compound formation processes, lexicalization and phonological remnants. *Natural Language and Linguistic Theory* 4(4). 445–513.
Lieber, R. & P. Štekauer (eds.). 2011. *The Oxford handbook of compounding*. Oxford: Oxford University Press.
Lillo-Martin, D. & R.P. Meier. 2011. On the linguistic status of 'agreement' in sign languages. *Theoretical Linguistics* 37(3/4). 95–141.
Lutalo-Kiingi, S. 2014. *A descriptive grammar of morphosyntactic constructions in Ugandan Sign Language (UgSL)*. University of Central Lancashire PhD dissertation.
Marsaja, G. 2008. *Desa Kolok – A deaf village and its sign language in Bali, Indonesia*. Nijmegen: Ishara Press.
Massone, M. I. 1994. Some distinctions of tense and modality in Argentinian Sign Language. In I. Ahlgren, B. Bergman & M. Brennan, (eds.), *Perspectives on sign language structure. Papers from the Fifth International Symposium on Sign Language Research*, 121–130. Durham: ISLA.
Mathur, G. & C. Rathmann. 2001. Why not 'GIVE-US': An articulatory constraint in signed languages. In V. Dively, M. Metzger, S. Taub & A.M. Baer (eds.), *Signed languages: Discoveries from international research*, 1–25. Washington, DC: Gallaudet University Press.
Mathur, G. & C. Rathmann. 2010. Verb agreement in sign language morphology. In D. Brentari (ed.), *Sign languages (Cambridge Language Surveys)*, 173–224. Cambridge: Cambridge University Press.
Mathur, G. & C. Rathmann. 2012. Verb agreement. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 136–157. Berlin: De Gruyter Mouton.
Meier, R.P. 1990. Person deixis in American Sign Language. In S.D. Fischer & P. Siple (eds.), *Theoretical issues in sign language research. Vol. 1: Linguistics*, 175–190. Chicago: University of Chicago Press.
Meir, I. 1999. A perfect marker in Israeli Sign Language. *Sign Language & Linguistics* 2(1). 43–62.
Meir, I. 2002. A cross-modality perspective on verb agreement. *Natural Language and Linguistic Theory* 20. 413–450.
Meir, I. 2004. Question and negation in Israeli Sign Language. *Sign Language & Linguistics* 7(2). 97–124.
Meir, I. 2012. Word classes and word formation. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 77–112. Berlin: De Gruyter Mouton.
Meir, I., M. Aronoff, W. Sandler & C. Padden. 2010. Sign languages and compounding. In S. Scalise & I. Vogel (eds.), *Cross-disciplinary issues in compounding*, 301–322. Amsterdam: John Benjamins.

Meir, I., C.A. Padden, M. Aronoff & W. Sandler. 2007. Body as subject. *Journal of Linguistics* 43. 531–563.
Meir, I. & W. Sandler. 2008. *A language in space. The story of Israeli Sign Language*. New York: Lawrence Erlbaum.
Miestamo, M. 2005. *Standard negation: The negation of declarative verbal main clauses in a typological perspective*. Berlin: Mouton de Gruyter.
Mithun, M. 1986. The convergence of noun classification systems. In C. Craig (ed.), *Noun classes and categorization*, 379–397. Amsterdam: John Benjamins.
Morgan, G. & B. Woll (eds.). 2007. *The linguistics of sign language classifiers: phonology, morpho-syntax, semantics, and discourse. Lingua* Special Issue 117(7).
NGC/Nederlands Gebarencentrum. 2002. *Basisgrammatica Nederlandse Gebarentaal* (CDRom), NGC & University of Amsterdam: Bunnik & Amsterdam.
Nijhof, S. & I. Zwitserlood. 1999. Pluralization in Sign Language of the Netherlands (NGT). In J. Don & T. Sanders (eds.), *OTS Yearbook 1998–1999*, 58–78. Utrecht: UiL OTS.
Oomen, M. 2016. The marking of two aspectual distinctions in Sign Language of the Netherlands (NGT). *Linguistics in Amsterdam* 9(2), 30–55.
Oviedo, A. 2004. *Classifiers in Venezuelan Sign Language*. Hamburg: Signum.
Özyürek, A., I. Zwitserlood & P. Perniss. 2010. Locative expressions in signed languages: A view from Turkish Sign Language (TİD). *Linguistics* 48(5). 1111–1145.
Padden, C.A. 1988 [1983]. *Interaction of morphology and syntax in American Sign Language* (Outstanding Dissertations in Linguistics, series IV). New York: Garland Press.
Padden, C.A. 1990. The relation between space and grammar in ASL verb morphology. In C. Lucas (ed.), *Sign language research: theoretical issues*, 118–132. Washington, DC: Gallaudet University Press.
Padden, C. 1998. The ASL lexicon. *Sign Language & Linguistics* 1(1). 39–60.
Padden, C.A. & D.M. Perlmutter. 1987. American Sign Language and the architecture of phonological theory. *Natural Language and Linguistic Theory* 5. 335–375.
Palmer, F.R. 2001. *Mood and modality,* 2nd ed. New York: Cambridge University Press.
Payne, J.R. 1985. Negation. In T. Shopen (ed.), *Language typology and syntactic description. Vol. I: Clause structure*, 197–242. Cambridge: Cambridge University Press.
Perniss, P. 2007. *Space and iconicity in German Sign Language*. University of Nijmegen PhD dissertation. Nijmegen: MPI Series in Psycholinguistics.
Pfau, R. 2008. The grammar of headshake: A typological perspective on German Sign Language negation. *Linguistics in Amsterdam* 1. 37–74.
Pfau, R. 2015. The grammaticalization of headshakes: From head movement to negative head. In A.D.M. Smith, G. Trousdale & R. Waltereit (eds.), *New directions in grammaticalization research*, 9–50. Amsterdam: John Benjamins.
Pfau, R. & E.O. Aboh. 2012. On the syntax of spatial adpositions in sign languages. *MIT Working Papers in Linguistics 68 (Proceedings of IATL 27*, ed. by E. Cohen & A. Mizrachi*)*, 83–104. Cambridge, MA: MITWPL.
Pfau, R. & J. Quer. 2007. On the syntax of negation and modals in Catalan Sign Language and German Sign Language. In P. Perniss, R. Pfau & M. Steinbach (eds.): *Visible variation. Comparative studies on sign language structure*, 129–161. Berlin: Mouton de Gruyter.
Pfau, R. & M. Steinbach. 2003. Optimal reciprocals in German Sign Language. *Sign Language & Linguistics* 6(1), 3–42.
Pfau, R. & M. Steinbach. 2005. Plural formation in German Sign Language: Constraints and strategies. In H. Leuninger & D. Happ (eds.), *Gebärdensprachen: Struktur, Erwerb, Verwendung* (*Linguistische Berichte* Special Issue 15), 111–144. Hamburg: Buske.
Pfau, R. & M. Steinbach. 2006. Pluralization in sign and in speech: A cross-modal typological study. *Linguistic Typology* 10. 135–182.

Pfau, R., M. Steinbach & B. Woll. 2012. Tense, aspect, and modality. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 186–204. Berlin: De Gruyter Mouton.

Pizzuto, E. & S. Corazza. 1996. Noun morphology in Italian Sign Language. *Lingua* 98. 169–196.

Portner, P.H. 2009. *Modality.* Oxford: Oxford University Press.

Pustejovsky, J. 1991. The syntax of event structure. *Cognition* 41. 47–81.

Quadros, R.M. de & J. Quer. 2008. Back to back(wards) and moving on: On agreement, auxiliaries and verb classes in sign languages. In R.M. de Quadros (ed.), *Sign languages: spinning and unraveling the past, present, and future. Forty-five papers and three posters from the 9th Theoretical Issues in Sign Language Research Conference, Florianopolis, Brazil, December 2006*. Petrópolis: Editora Arara Azul. [Available at: www.editora-arara-azul.com.br/EstudosSurdos.php].

Quer, J. 2012. Negation. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 316–339. Berlin: De Gruyter Mouton.

Rathmann, C. 2005. *Event structure in American Sign Language.* University of Texas at Austin PhD dissertation.

Saeed, J.I. 2003. Sentence semantics 1: Situations: 5.3. Modality and evidentiality. In J.I. Saeed (ed.), *Semantics*, 138–145. Malden, MA: Blackwell.

Sandler, W. 1993. Hand in hand: The roles of the nondominant hand in sign language phonology. *The Linguistic Review* 10. 337–390.

Sandler, W. & D. Lillo-Martin. 2006. *Sign languages and linguistic universals*. Cambridge: Cambridge University Press.

Scalise, S. & I. Vogel (eds.). 2010. *Cross-disciplinary issues in compounding*. Amsterdam: John Benjamins.

Schadeberg, T.C. 2003. Derivation. In D. Nurse & G. Philippson (eds.), *The Bantu languages*, 71–89. London: Routledge.

Schembri, A. 2003. Rethinking 'classifiers' in signed languages. In K. Emmorey (ed.), *Perspectives on classifier constructions in sign languages*, 3–34. Mahwah, NJ: Lawrence Erlbaum.

Schermer, T.M. 1990. *In search of a language. Influences from spoken Dutch on Sign Language of the Netherlands*. Delft: Eburon Publisher.

Schermer, T. & C. Koolhof. 1990. The reality of time-lines: Aspects of tense in Sign Language of the Netherlands (SLN). In S. Prillwitz & T. Vollhaber (eds.), *Proceedings of the Forth International Symposium on Sign Language Research*, 295–305. Hamburg: Signum.

Schuit, J. 2013. *Typological aspects of Inuit Sign Language*. University of Amsterdam PhD dissertation.

Schwager, W. & U. Zeshan. 2010. Word classes in sign languages. Criteria and classifications. In U. Ansaldo, J. Don & R. Pfau (eds.), *Parts of speech: Empirical and theoretical advances*, 5–41. Amsterdam: John Benjamins. [previously published in *Studies in Language* 32(3), 2008].

Shaffer, B. 2000. *A syntactic, pragmatic analysis of the expression of necessity and possibility in American Sign Language*. University of New Mexico, Albuquerque, PhD dissertation.

Shaffer, B. 2002. CAN'T: The negation of modal notions in ASL. *Sign Language Studies* 3(1). 34–53.

Sinte, A. 2013. Expression of time in French Belgian Sign Language (LSFB). In L. Meurant, A. Sinte, M. Van Herreweghe & M. Vermeerbergen (eds.), *Sign language research, uses and practices: Crossing the views on theoretical and applied sign language linguistics*, 206–235. Berlin & Nijmegen: De Gruyter Mouton & Ishara Press.

Skant, A., I. Okorn, E. Bergmeister, F. Dotter, M. Hilzensauer, M. Hobel, K. Krammer, R. Orter & N. Unterberger. 2002. Negationsformen in der Österreichischen Gebärdensprache. In R. Schulmeister & H. Reinitzer (eds.), *Progress in sign language research: In honor of Siegmund Prillwitz*, 163–185. Hamburg: Signum.

Smith, C. 1997. *The parameter of aspect (2nd edition)*. Dordrecht: Kluwer.

Spencer, A. 1991. *Morphological theory. An introduction to word structure in generative grammar*. Oxford: Blackwell.

Spencer, A. & A. Zwicky (eds.). 2001. *The handbook of morphology*. Oxford: Blackwell.
Stavans, A. 1996. One, two, or more: the expression of number in Israeli Sign Language. In W.H. Edmondson & R.B. Wilbur (eds.), *International review of sign linguistics*, 95–114. Mahwah, NJ: Erlbaum.
Steele, S. 1978. Word order variation: a typological study. In J.H. Greenberg, C.A. Ferguson & E.A. Moravcsik (eds.), *Universals of human language: IV: Syntax*, 585–623. Stanford: Stanford University Press.
Steinbach, M. 2012. Plurality. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 112–136. Berlin: De Gruyter Mouton.
Štekauer, P. & R. Lieber (eds.). 2005. *Handbook of word formation*. Dordrecht: Springer.
Supalla, T. 1986. The classifier system in American Sign Language. In C. Craig, C. (ed.), *Noun classes and categorization*, 181–214. Amsterdam: John Benjamins.
Supalla, T. 1990. Serial verbs of motion in ASL. In S. Fischer & P. Siple (eds.), *Theoretical issues in sign language research*, *Vol. 1: Linguistics*, 127–152. Chicago: Chicago University Press.
Supalla, T. & E.L. Newport. 1978. How many seats in a chair? The derivation of nouns and verbs in American Sign Language. In P. Siple (ed.), *Understanding language through sign language research*, 91–132. New York: Academic Press.
Sutton-Spence, R. 2006. Fingerspelling. In K. Brown (ed.), *Encyclopedia of language and linguistics, Vol. 4* (2nd edition), 468–473. Oxford: Elsevier.
Sutton-Spence, R. & B. Woll. 1999. *The linguistics of British Sign Language. An introduction*. Cambridge: Cambridge University Press.
Tang, G. 2003. Verbs of motion and location in Hong Kong Sign Language: Conflation and lexicalization. In K. Emmorey (ed.), *Perspectives on classifier constructions in sign languages*, 143–165. Mahwah, NJ: Lawrence Erlbaum.
Tang, G. 2006. Questions and negation in Hong Kong Sign Language. In U. Zeshan (ed.), *Interrogative and negative constructions in sign languages*, 198–224. Nijmegen: Ishara Press.
Taşçı, S.S. 2012. *Phonological and morphological aspects of lexicalized fingerspelling in Turkish Sign Language (TİD)*. Boğaziçi University, Istanbul, MA thesis.
Thompson, R., K. Emmorey & R. Kluender. 2006. The relationship between eye gaze and verb agreement in American Sign Language: an eye-tracking study. *Natural Language and Linguistic Theory* 24. 571–604.
Veinberg, S.C. & R.B. Wilbur. 1990. A linguistic analysis of the negative headshake in American Sign Language. *Sign Language Studies* 68. 217–244.
Vercellotti, M.L. & D.R. Mortensen. 2012. A classification of compounds in American Sign Language: an evaluation of the Bisetto and Scalise framework. *Morphology* 22. 545–579.
Vos, C. de. 2012. *Sign-spatiality in Kata Kolok: How a village sign language of Bali inscribes its signing space*. Max Planck Institute for Psycholinguistics, Nijmegen, PhD dissertation.
Wallin, L. 1983. Compounds in Swedish Sign Language. In J. Kyle & B. Woll (eds.), *Language in sign*, 56–68. London: Croom Helm.
Wilbur, R.B. 2008. Complex predicates involving events, time and aspect: Is this why sign languages look so similar? In J. Quer (ed.), *Signs of the time: Selected papers from TISLR 2004*, 217–250. Hamburg: Signum.
Wilbur, R.B. 1987. *American Sign Language: Linguistic and applied dimensions*. Boston: College-Hill.
Wilbur, R.B. 2010. The semantics-phonology interface. In D. Brentari (ed.), *Sign languages (Cambridge Language Surveys)*, 355–380. Cambridge: Cambridge University Press.
Wilbur, R.B. 2013. The point of agreement: Changing how we think about sign language, gesture, and agreement. *Sign Language & Linguistics* 16(2). 221–258.

Wilcox, P. 1996. Deontic and epistemic modals in ASL: A discourse analysis. In A. Goldberg (ed.), *Conceptual structure, discourse and language*, 481–492. Cambridge: Cambridge University Press.

Wilcox, S.E. & B. Shaffer. 2006. Modality in ASL. In W. Frawley (ed.), *The expression of modality*, 207–237. Berlin: De Gruyter Mouton.

Wilcox, S.E. & P. Wilcox. 1995. The gestural expression of modality in ASL. In J. Bybee & S. Fleischman (eds.), *Modality in grammar and discourse*, 135–162. Amsterdam: John Benjamins.

Yang, J.H. & S. Fischer. 2002. Expressing negation in Chinese Sign Language. *Sign Language & Linguistics* 5(2). 167–202.

Zeshan, U. 2000. *Sign language in Indo-Pakistan. A description of a signed language*. Amsterdam: John Benjamins.

Zeshan, U. 2003. Indo-Pakistani Sign Language grammar: A typological outline. *Sign Language Studies* 3(2). 157–212.

Zeshan, U. 2004. Hand, head and face: Negative constructions in sign languages. *Linguistic Typology* 8. 1–58.

Zeshan, U. (ed.). 2006a. *Interrogative and negative constructions in sign languages*. Nijmegen: Ishara Press.

Zeshan, U. 2006b. Negative and interrogative constructions in sign languages: A case study in sign language typology. In U. Zeshan (ed.), *Interrogative and negative constructions in sign languages*, 28–68. Nijmegen: Ishara Press.

Zucchi, S. 2009. Along the time line: Tense and time adverbs in Italian Sign Language. *Natural Language Semantics* 17. 99–139.

Zwicky, A.M. & G.K. Pullum. 1983. Cliticization vs. inflection: English *n't*. *Language* 59(2). 502–513.

Zwitserlood, I. 2003. *Classifiying hand configurations in Nederlandse Gebarentaal*. University of Utrecht PhD dissertation. Utrecht: LOT.

Zwitserlood, I. 2012. Classifiers. In R. Pfau, M. Steinbach & B. Woll (eds.), *Sign language – An international handbook*, 158–186. Berlin: De Gruyter Mouton.

Zwitserlood, I. & I. van Gijn. 2006. Agreement phenomena in Sign Language of the Netherlands. In P. Ackema, P. Brandt, M. Schoorlemmer & F. Weerman (eds.), *Arguments and agreement*, 195–229. Oxford: Oxford University Press.

Zwitserlood, I., P. Perniss & A. Özyürek. 2012. An empirical investigation of expression of multiple entities in Turkish Sign Language (TİD): Considering the effects of modality. *Lingua* 122. 1636–1667.

Zwitserlood, I., P. Perniss & A. Özyürek. 2013. Expression of multiple entities in Turkish Sign Language (TİD). In E. Arık (ed.), *Current directions in Turkish Sign Language research*, 273–302. Newcastle upon Tyne: Cambridge Scholars Publishing.