The Pseudo-simultaneous Nature of Complex Verb Forms in German Sign Language

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In this paper, we shall be concerned with the nature of the morphosyntactic structure of verb signs in German Sign Language (Deutsche Gebaerdensprache: DGS). It has often been claimed that the morphological and morphosyntactic structure of signs is fundamentally different from what we know from the analysis of spoken languages. In the following, we intend to demonstrate that this, in fact, is not the case.

Firstly, we are going to say a few words about simultaneity in sign languages. Secondly, we present a syntactic tree structure for DGS: In this structure, complex verb forms can be derived by head-to-head movement of the verb stem through various functional heads. Thirdly, we briefly present a phonological feature hierarchy for signed languages. Then we discuss the different inflectional modifications in turn, each time looking at the morphosyntactic and the phonological aspects of the respective modification. As the discussion of the phonological aspects will make clear, the simultaneity we observe is in fact an epiphenomenon of the application of various readjustment rules.

1 The Notion of Simultaneity

One key word in the description of signed languages is simultaneity, a concept which is often taken to be a fundamental property of signed languages. It is claimed that, compared to spoken languages, signed languages are characterized by a higher degree of simultaneity. Above all, the questions we have to ask are:

1. What does this use of the term „simultaneity“ mean; and 2. How can the observed simultaneity be grammatically encoded?

First of all, simultaneity means that in sign languages we may see more than one grammatical information at a given time. For example, in a sentence like ”I don’t give you a pencil” person agreement is encoded through the beginning and ending points of the verb sign and negation by changing its nonmanual component. Simultaneously, agreement with the direct object is realized by a particular classifier handshape. We will briefly illustrate this point with the verb GEBEN „to give“. The citation form of GEBEN is shown in (1a). With a long and thin object like STIFT „pencil“ in (1c), however, the classifier handshape in (1b) has to be used. For the purpose of sentential negation, a nonmanual feature, i.e. a headshake, will be added (1d).[1]

(1) a. *Citation form of GEBEN* b. *Classifier handshape for long and thin objects*

Sorry; pictures missing

c.

ICH$_1$	DIR$_2$	STIFT$_a$	$_1$[GEB-CL$_a$]$_2$
I	*you*	*pencil*	*give*

”I give you a pencil.”

d.

			________neg	
ICH$_1$	DIR$_2$	STIFT$_a$	$_1$[GEB-CL$_a$]$_2$	(NICHT)
I	*you*	*pencil*	*give*	*not*

”I don’ t give you a pencil.”

Obviously, in example (1d) object agreement and negation are encoded by different morphemes, namely handshape change and nonmanual marking, which are simultaneously realized. This kind of morphological encoding is frequently used in signed languages but only rarely in spoken languages (e.g. tonal languages) which more often display linear ordering of morphemes.

Emmorey (1995) argues that the simultaneity displayed in signed languages is due to the visual-gestural modality. In a psycholinguistic experiment, she shows that the articulators used in signed languages - mainly the hands – are to slow to linearly encode all the information needed in a certain processing time. This shortcoming, she argues, is compensated for by a higher degree of simultaneity which, in her opinion, manifests itself in the frequent use of nonconcatenative morphological processes. At the same time, Emmorey and others (e.g. Bergman 1982) observe that linear affixation is rarely used in signed languages. These findings lead Emmorey to the conclusion that needs imposed by processing limitations may have consequences for grammatical representations in certain languages.

However, Emmorey does not focus on an explanation for her observations in terms of grammar theory. On the morphosyntactic side, the absence of surface affixation does not necessarily imply that there is no affixation at all, as is argued for in Halle & Marantz (1993) and Glueck & Pfau (1999). Due to the involvement of empty affixes and phonological readjustment rules, linear affixation may just not be visible on the surface.

As the previous discussion makes clear, a detailed analysis of the high degree of simultaneity in sign languages in grammatical terms is required. It may then turn out that the more we go into the grammatical description of sign languages the more the differences between signed and spoken languages disappear (cf. Brentari 1998).

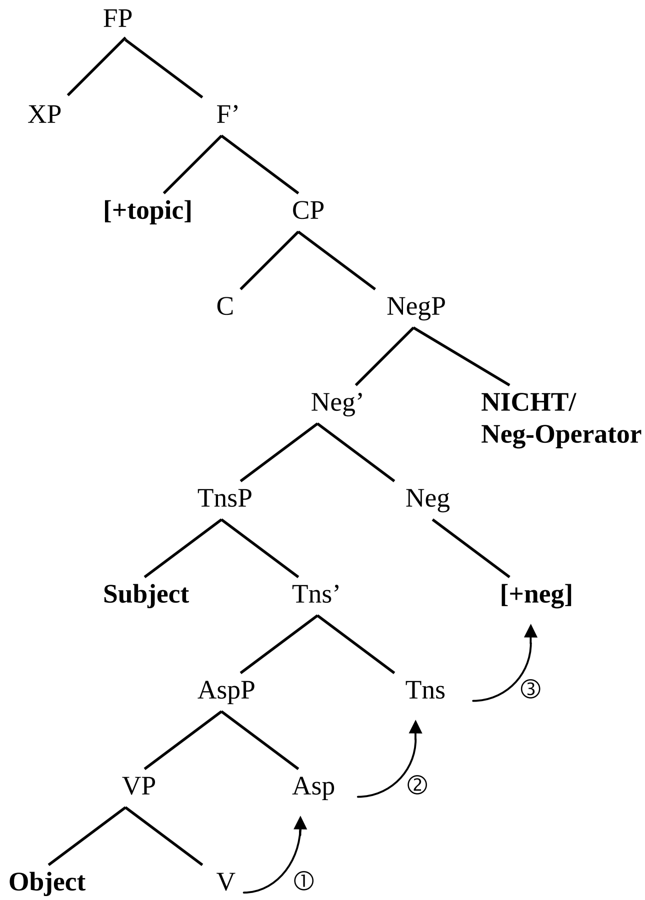
2 Some Syntactic and Phonological Properties of DGS

Within the framework of Distributed Morphology as proposed by Halle & Marantz (1993), inflected verbs are derived by the operations of head-to-head movement, merger, and fusion in the syntax and on the post-syntactic level of Morphological Structure (MS). Since on the one hand, the syntactic structure is crucial for the subsequent application of readjustment and Spell-out rules, we shall first sketch some of the syntactic properties of DGS. Readjustment rules, on the other hand, refer to and possibly change certain phonological features of a given sign. A phonological feature tree for signed languages will help us to make statements about the precise nature of the morphophonological modifications under discussion.

2.1 A syntactic tree structure for DGS

German Sign Language is a strict SOV-language. Moreover, DGS does not exhibit any asymmetries between matrix sentences and embedded sentences like e.g. spoken German, i.e. there is no V2-effect. The structure in (2) represents the syntactic tree structure we assume for DGS (cf. Glueck & Pfau 1999; Pfau 1999):

(2)



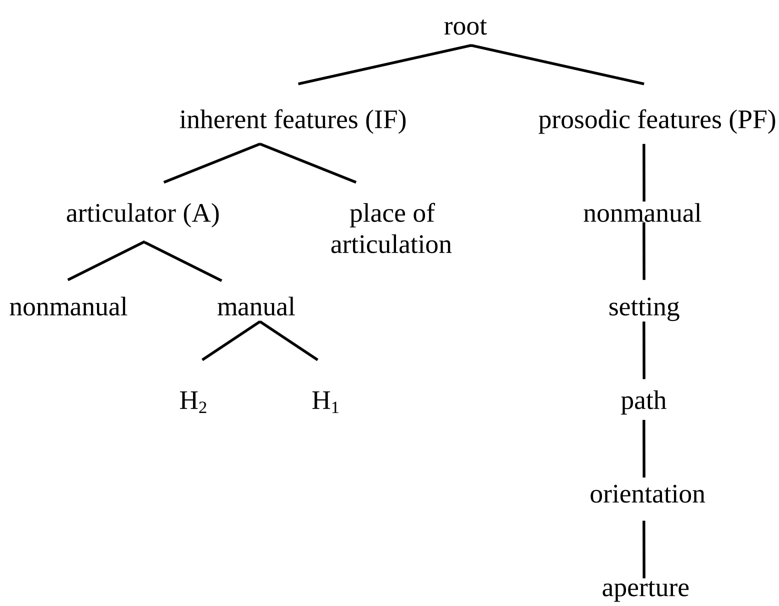
The structure in (2) differs from structures which have been proposed for ASL (e.g. Neidle et al. 1998) in important respects: First of all, word order in ASL is

SVO, not SOV. Moreover, following the Distributed Morphology framework of Halle & Marantz (1993) we assume that agreement nodes are not present in the syntax. Rather, they are inserted prior to Spell-out on the level of Morphological Structure by adjunction of Agr-morphemes to functional heads. Although Tns is not visible on DGS verbs, we take Tns to be an active node, with SpecTP hosting the subject DP and AgrS being adjoined to Tns on MS.[2]

2.2 Feature geometry

The second important preliminary for the following discussion is a feature geometry for signed languages. Brentari (1998) presents a comprehensive phonological analysis of ASL which in part can be applied to DGS. The feature tree she proposes for ASL will turn out to be very helpful in our analysis of morphophonological processes within the framework of Distributed Morphology. This feature tree is given in (3) (Brentari 1998:94,130).

(3)



The root node branches into an inherent feature (IF) node and a prosodic feature (PF) node. These two nodes dominate two completely different sets of features which are needed to capture lexical contrasts in ASL.[3]

Inherent features are paradicmatically realized features comparable to paradicmatically realized features in spoken languages, like e.g. place, manner, and voicing in consonants. An important difference to spoken languages is that IF are not realized over the course of a segment but rather over the course of a whole lexeme. The IF node comprises the manual, nonmanual, H_1, H_2, and place features that are left unchanged during the production of a sign.

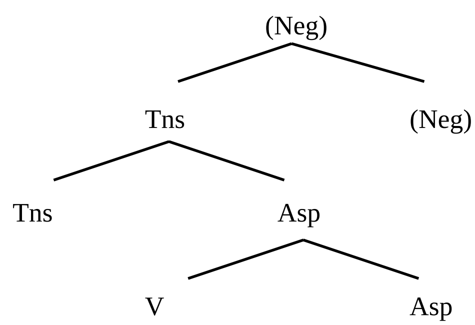
In contrast to that, the PF part of the tree is needed to account for feature changes which may appear in certain signs, e.g. handshape changes or path movements. Prosodic features may change in the course of producing signs, which implies that they may be realized sequentially in time.

We shall not discuss this feature geometry proposed for ASL in detail. It will turn out that it can capture much of the phonological facts in DGS, too.

3 The Derivation of Complex Forms

We shall now have a closer look at the morphosyntactic and phonological side of the derivation of inflected verbs in DGS. As mentioned above, in the syntax the verb raises via head-to-head-movement to Asp and then to Tns (movement operations ① and ② in (2)). Each time the verb raises, it adjoins to the next head in the tree yielding a complex structure under the Tns node like the one in (4).

(4)



We take the structure below Tns to be the basis for the different instances of agreement, the realization of which crucially depends on the paradigmatic dimension of the respective verb stem (sections 3.1 and 3.2); it is also the basis for aspectual modification (footnote 5). Finally, in section 3.3, we shall see that things are somewhat more intricate in negated sentences.

3.1 Agreement I: Path movement

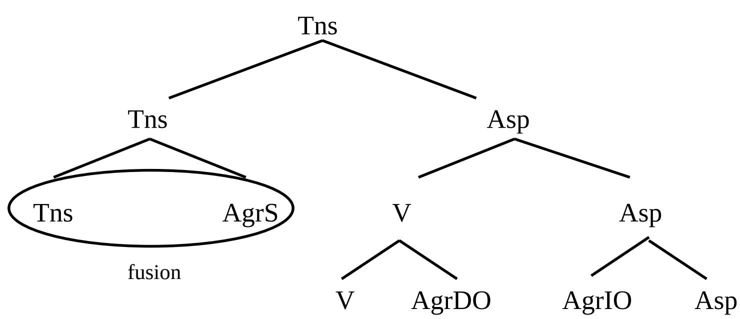
It is a well known fact that in DGS as well as in other sign languages, different verb types have to be distinguished with respect to their agreement properties (cf. Padden 1990; Glueck & Pfau 1999). The so-called ‘plain verbs’ do not inflect for person and number information at all. In one subclass of agreement verbs, verbs agree with their subject and direct or indirect object. This kind of agreement is established via path movement. In (5ab) the respective verb signs start at the position of the subject and the movement proceeds towards the position of the direct object (both of which may have been established in the signing space before by means of indexing).

(5) a. ICH$_1$ DICH$_2$ ZEIT $_1$FRAG$_2$
I you time ask
„I ask you the time.“

b. ICH$_1$ EUCH$_3$ ANTWORT $_1$FRAG$_3$
I you(pl.) answer ask
„I’m asking you(pl.) for the answer.“

On the morphosyntactic side, Agr nodes will attach to heads within the derived complex (4) at MS to pick up the features of DPs governed by these heads: AgrS attaches to Tns, AgrDO to V and AgrIO to Asp. The insertion of Agr morphemes transforms tree (4) into tree (6):

(6)



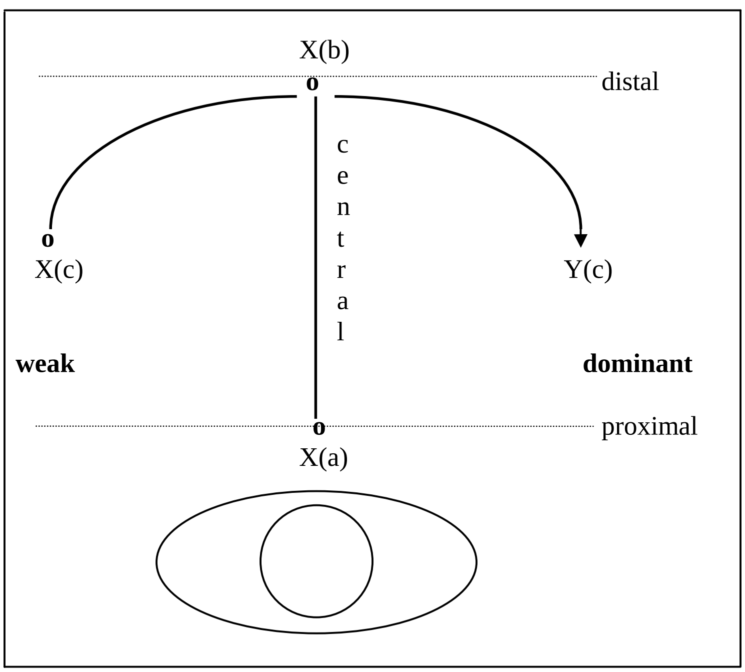
Tns being a phonologically null morpheme, it will subsequently fuse with its sister node AgrS. Thus the number of terminal nodes will be reduced and only one Vocabulary item will be inserted once Vocabulary insertion takes place.

On the phonological side, the surface form of the inflected verb is derived by affixation of the appropriate path features. The relevant Vocabulary items for the person/number affixes under discussion are given in (7):

(7) a. [+1sg] → [$X_{prox.body-central-neutral}$]
(where X is a point in the signing space)
b. [+2sg] → [$X_{dist.body-central-neutral}$]
(where X is a point in the signing space)
c. [+2pl] → [$_{X-weak}ARC_{Y-dominant}$]

The agreement affixes in (7) do not show variation in their phonological shape. Consequently, application of readjustment rules is not necessary. The Vocabulary item (7a) e.g. is a point in the signing space which is near (proximal to) the signer's body in a central neutral position. The picture in (8) serves to illustrate the above mentioned Vocabulary items.[4]

(8)



The small letters in the picture (e.g. X(a)) relate to the points in the signing space mentioned in the Vocabulary items (7a-c). Consider e.g. again the Vocabulary item for second person plural object agreement (no matter if it is a direct or indirect object): this agreement affix is realized by adding an arc-shaped movement to the verb stem. Consequently, in the sequence (5b) ICH$_1$ EUCH$_3$ ANTWORT $_1$FRAG$_3$ „I'm asking you(pl.) for the answer" the movement proceeds from the proximal point X(a) (for first person singular subject) towards X(c) on the weak hand side and then in a curve to the dominant hand side of the signer.

3.2 Agreement II: Classifiers

In our opinion, classifying verbs in DGS constitute another group of agreement verbs. In Glueck & Pfau (1998) we have presented syntactic and psycholinguistic arguments in favour of such an analysis. Classifying verbs classify one argument - their subject or direct object - by means of a handshape change. In (9ab) the verb classifies its subject; the respective handshapes are given in (9a'b'). In (9c) the verb agrees with all its arguments. As you can see, agreement via path movement (for the subject and the indirect object) and agreement via handshape (for the direct object) can be combined in one verb.

(9) a. STRASSE MANN$_a$ GEH_UEBER-CL$_a$
street *man* *go.over*
„A man crosses the street."

b. STRASSE HUND$_b$ GEH_UEBER-CL$_b$
street *dog* *go.over*
„A dog crosses the street."

a'. b'.

Sorry; pictures missing

c. MANN$_1$ KIND$_2$ BLUME$_a$ $_1$[GEB-CL$_a$]$_2$
man *child* *flower* *give*
„A man gives a flower to the child."

Again, on the morphosyntactic side, the relevant tree for the derivation of the inflected verbs is the tree in (6). As far as the derivation of (9c) is concerned, we must assume that the maximum of three agreement nodes is implemented at Morphological Structure.

In contrast to the person/number-affixes discussed in the previous section, classifier agreement does not show a fixed phonological shape. Therefore, we assume that the Vocabulary item for the classifier feature is a zero affix (cf. Halle 1990).

(10) [+CL-F] → ∅

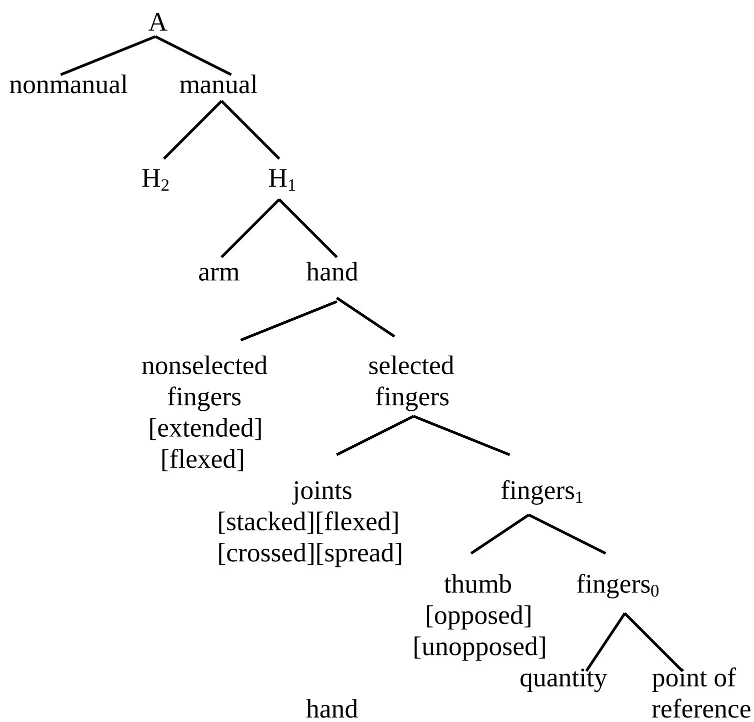
On the level of Morphological Structure, the classifier feature will trigger a phonological readjustment rule which results in the appropriate handshape change. This readjustment rule is informally given in (11). Note that this phonological modification is comparable to umlaut and ablaut phenomena in spoken languages.

(11) handshape → handshape / [+CL-F]
                                              |
                                        [Cl-F_1]
                                        [Cl-F_2]
                                        ...
                                        [Cl-F_n]

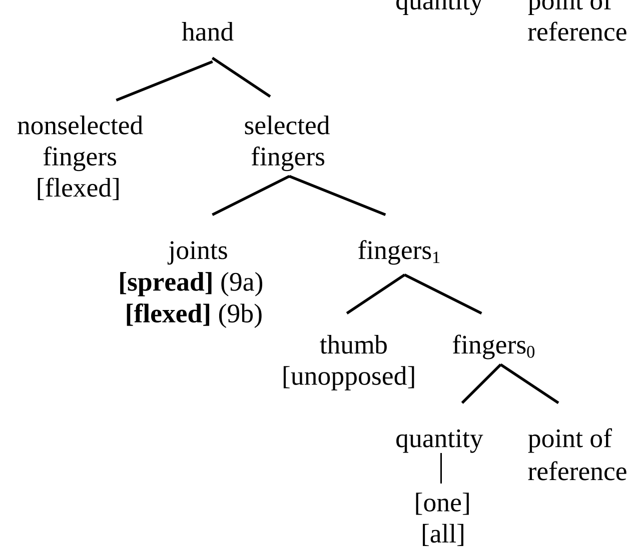
Let's now have a closer look at the phonological side of classification. The relevant part of Brentari's feature tree is the branch below the manual side of the articulator node given in (12), because this is where the handshape features are specified (cf. Brentari 1998:100).

The respective feature specifications for the verbs in (9ab) are given in (13). The feature specification for the verb in (9a) which classifies a two-legged creature differs from the one of (9b) which classifies a four-legged animal only in the joint features of the selected fingers: those are specified as [spread] in nonbase position for the former while for the latter the joints of the selected fingers are flexed.

(12)

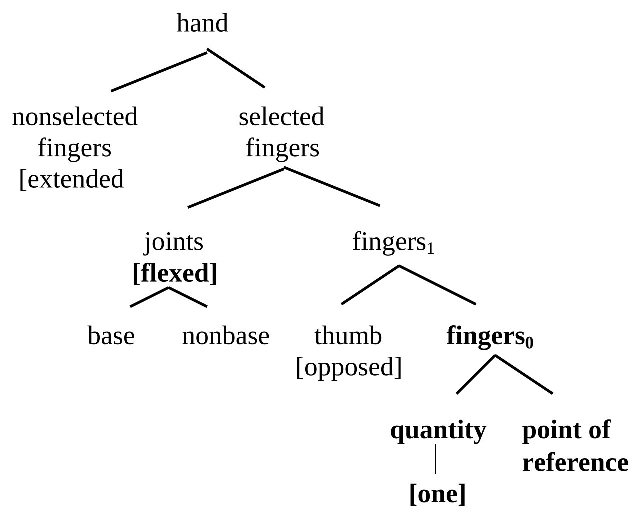

A
nonmanual
manual
H_2
H_1
arm
hand
nonselected fingers [extended] [flexed]
selected fingers
joints [stacked][flexed] [crossed][spread]
$fingers_1$
thumb [opposed] [unopposed]
$fingers_0$
quantity
point of reference

(13)


hand
nonselected fingers [flexed]
selected fingers
joints **[spread]** (9a) **[flexed]** (9b)
$fingers_1$
thumb [unopposed]
$fingers_0$
quantity
point of reference
[one]
[all]

In the case of object classification, a marked handshape replaces an unmarked one. As it happens, the modifications are somewhat more complex than in the case of subject classification. For the citation form of GEB „to give“ (cf. (1a) above) no fingers are selected and a curved open handshape surfaces. With the long thin object BLUME „flower“ as direct object, however, a different handshape has to be chosen. This is the so-called F-handshape (cf. (1b)) which is characterized by the feature tree in (14).

(14)



3.3 Negation

Sentence negation in signed languages is particularly interesting because it comprises a manual and a non-manual component. The manual part is a Neg sign which , however, is optional, while the non-manual part is a headshake, which in DGS is necessarily associated with the predicate. In DGS, the manual Neg sign NICHT „not“ is one of the very few elements that may follow the verb. Two examples for negated sentences are given in (15ab):

(15) a. GESTERN ______neg SCHNEI (NICHT)
yesterday *snow* *not*
„Yesterday it did not snow.“

$\overline{}$neg

b. DEIN FRISUR NEU SCHOEN (NICHT)
your hairstyle new nice not
„Your new hairstyle is not nice."

Pfau (1999) presents a detailed analysis of sentence negation for DGS. He claims that typologically negation in DGS is an instance of split negation. The manual sign NICHT is base-generated in the specifier position of the Neg phrase; following Haegeman & Zanuttini (1991) we assume that there is a Neg operator in SpecNegP when the manual sign is not present. The head of the NegP contains an empty affix which is attached to the verb stem in the course of the derivation (movement operation ③ in structure (2) above).

On the morphosyntactic side, further raising of the verb to Neg results in an adjunction structure like the complete tree in (4); insertion of Agr nodes on MS is of course possible in exactly the same way as described earlier.

Again, we must assume that the relevant Vocabulary item is a zero affix which leads to a stem-internal modification.

(16) [+neg] → ∅

Phonological readjustment, however, is somewhat different from the cases we have discussed so far since it applies to the nonmanual component of the verb sign. It has long been realized that nonmanual features like facial expressions and face and body position have to be included in the phonological description of a sign. Brentari (1998) takes this into account in including nonmanuals in the feature tree in (3) above.

The readjustment rule in (17) adds a headshake to the nonmanual node. Note that this is the nonmanual node of the PF branch in (3) not the one of the articulator branch because the latter is responsible for lexical contrast only.

(17) nonmanual → nonmanual / [+neg]
|
[headshake]

Again, as with path movement and classifier agreement, this readjustment rule involves only a minimal phonological change.[5]

4 Conclusion

The analysis we presented facilitates an almost modality-independent explanation for the often mentioned high degree of simultaneity in signed languages. On the syntactic and morphosyntactic side, the structures and operations involved in the derivation of inflected verbs turn out to be exactly the same as in spoken languages. On the phonological side, however, we do of course observe differences which are due to the different articulators used. Still, important phonological concepts like the hierarchical organisation of features, the idea of class nodes etc. are central to the description of signed languages, too, as Brentari (1998) has convincingly shown.

The various inflectional phenomena we discussed are all instances of phonological simultaneity. Phonological simultaneity, however, is also common in spoken languages, where in the production of segments various phonological features are always simultaneously realized.

To sum up, our claim is that on the morphosyntactic side, simultaneity in the true sense does not exist in DGS. Rather, what we are dealing with in fact is pseudo-simultaneity.

Notes

1. All sign language examples are given in capital letters. In the examples numeral indices represent person and number agreement by referring to points in the signing space. These points either indicate the position of a present referent or they refer to NPs that have been positioned in the signing space before by means of indexing. A letter index indicates which argument the classifier (CL) on the verb refers to. A line on top of a sign illustrates the span of a nonmanual marking, e.g. a headshake in negated sentences.

2. At the moment, we do not wish to make any statements about the structure above C. We only want to stress that topicalization is a very common operation in DGS (and other sign languages). Topicalized DPs are moved to a position above CP labelled as Focus Phrase (FP) in the tree in (2).

3. Brentari's feature geometry differs in that respect from the hand tier-model presented by Sandler (1989) where H2 features can either be dominated by the Hand Configuration node or function as an articulator and are as such part of the location tree.

4. Sorry; this sketch unintentionally discriminates left-handed signers.

5. Aspectual modification also involves the simultaneous realization of grammatical information; due to space limitations, however, we can not discuss its properties in detail here. The habitual and the iterative e.g. surface as movement modifications and subsequent reduplication of the whole sign. On the morphosyntactic side, the relevant tree for the position of aspectual (zero) affixes is the one in (6) above. On the phonological side, readjustment rules affect features of the highest level of the prosodic feature branch in (3) only, i.e. movement features like [straight], [arc], and [trilled movement] which are directly dominated by the prosodic feature node.

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