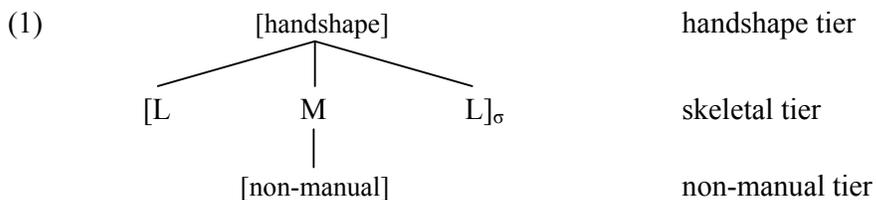


On Spreading: Domains and Hierarchies

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1 Introduction¹

- Starting point: non-manual markers (NMMs) in sign language (SL), just like tones in spoken language, are suprasegmental in the sense that they constitute a layer *on top of* the segmental layer. Unlike tones, however, various NMMs can be layered (Wilbur 2000).
- In SL, the segmental layer, i.e. the skeleton, consists of sequences of Locations (Holds) and Movements (Liddell & Johnson 1989; Sandler 1989; Brentari 1998); the maximal syllable being L-M-L.
- Handshape is usually argued to be an autosegment that associates with skeletal positions (Sandler 1989); see the representation in (1).



- (1) also illustrates that I assume that NMMs generally associate with the Movement segment, the most sonorant element of the sign syllable (Perlmutter 1992), as is evidenced by the fact that, whenever possible, NMMs tend to be synchronized with the movement of the sign(s) they accompany (Brentari 1998; Woll 2001).
- GOAL: examine and account for the spreading behavior of different types of NMMs and compare the attested patterns to those described for tone spreading in spoken languages.

2 Suprasegmentals in spoken languages: tone languages

2.1 Lexical tones

- In tone languages, the pitch quality of a word’s vowel(s) can change the meaning of that word. Tone languages may distinguish between two and four/five tone levels, e.g. high (á), low (à), and mid (ā) tone.
- The examples in (2) and (3) exemplify lexically contrastive tones: a two-tone system in Dagaare (Gur; Ghana) in (2) (Yip 2002: 2), a three-tone system in Punjabi (Indo-Aryan; India) in (3) (Yip 2002: 26).

(2) a. yùòrí (L–H) b. yúórí (H–L) [Dagaare]
 ‘penis’ ‘name’

¹ I am indebted to Enoch Aboh and Markus Steinbach for providing invaluable feedback concerning syntactic and typological issues. On the handout, the following abbreviations for sign languages are used:

ASL: American Sign Language	LIS: Italian Sign Language
BSL: British Sign Language	LSC: Catalan Sign Language
DGS: German Sign Language	NGT: Sign Language of the Netherlands
DSGS: Swiss-German Sign Language	SSL: Swedish Sign Language
HKSL: Hong Kong Sign Language	TİD: Turkish Sign Language

- (3) a. kòRaa 'horse' b. kōRaa 'whip' c. kóRaa 'leper' [Punjabi]

→ Level tones may combine in contour tones, e.g. rising (sequence LH: ǎ) and falling (sequence HL: â); see the Cantonese examples in (4) (adapted from Yip 1995: 478).

- (4) a. sí (H) 'poem' b. sì (L) 'try' [Cantonese]
 c. sî (HL) 'silk' d. sǐ (LH) 'cause'

2.2 Tonal morphemes

→ Besides lexical functions, tones can also fulfill morphological functions. The Hausa (Chadic; Nigeria) example in (5) illustrates conversion by tone change; the N-forming suffix is a low tone which attaches to the stem (Newman 1992; in Yip 2002: 106).

- (5) a. sháa (H) 'to drink' → shâa (HL) 'drinking (N)' [Hausa]
 b. cí (H) 'to eat' → cîi (HL) 'eating (N)'

→ Aspectual distinctions may also be marked and/or accompanied by tone changes. In Suma (Ubangi; Central African Republic), verb roots are lexically toneless and receive their tone from a tense-aspect suffix: high tone in the imperfective, mid-tone in the perfective (6) (Odden 2007: 66).

- (6) a. kír-í (H-H) look.for-IMPERF kîr-ā (M-M) look.for-PERF [Suma]
 b. dáf-í (H-H) make-IMPERF dāf-ā (M-M) make-PERF

→ In the Yaitapéc dialect of Chatino (Oto-Manguéan; Mexico), the functional load of tone is even higher. The examples in (7) show that person distinctions can be marked by tone only (note: there are four tone levels: à < ā < ǎ < á) (Pride 1963; in Yip 2002: 230).

- | (7) | | <i>Class A</i> | <i>Class C</i> | <i>Class E</i> | |
|-----|---------------|----------------|----------------|----------------|-----------|
| a. | 1.SG | ngīnǎ | ndíʔó | líʔyā | [Chatino] |
| b. | 2/3.SG.COMPL | ngínó | ndiʔō | líʔyá | |
| c. | 2/3.SG.INTENT | ngīnǎ | ndiʔō | líʔyā | |
| | | 'hear' | 'drink' | 'carry' | |

2.3 Syntactic functions of tone: tonal particles & clitics

→ As illustrated in (8), in Gungbe (Kwa; Benin), yes/no-questions require the presence of a sentence-final low tone. The falling tone on the verb in (8b) derives from a combination of the lexical high tone of *wá* ('come/arrive') and the sentence-final floating low tone that triggers the question reading (Aboh and Pfau, in press).

- (8) a. Sétò kò wá (H) [Gungbe]
Seto already arrive
‘Seto arrived already.’
b. Sétò kò wâ (HL)
Seto already arrive.INTER
‘Has Seto arrived yet?’

→ Following Aboh (2004), Aboh & Pfau assume that the low tone is a particle occupying a functional head in the left periphery (Inter^o) and that the whole proposition is attracted into SpecInterP (see Section 5.2).

→ Yoruba (Benue-Congo; Nigeria) has a tonal clitic, the “subject marking high tone” which cliticizes to the right edge of subject NPs; see (9) (Akinlabi & Liberman 2001).

- (9) a. [ōmō H] lō → ōmó lō [Yoruba]
child go ‘The child went.’
b. [ōmō ōkùnrīn H] lō → ōmō ōkùnrīn lō
child male go ‘The boy went.’

2.4 Spreading

→ A characteristic property of suprasegmentals is that they are capable of spreading; this phenomenon is also referred to as “tone sandhi”. Three options have to be distinguished.

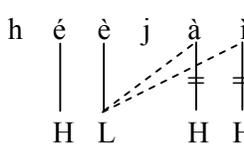
→ First, a tone may spread onto a segment that is underlyingly toneless. In the Chilungu (Bantu; Zambia) examples in (10a), we observe unbounded H spread from the infinitival high-tone prefix *kú-* onto all except the last syllable (Bickmore 1996: 11). (10b) illustrates the spreading process.

- (10) a. kú-vúl-à ‘to be enough’ [Chilungu]
kú-sáákúl-à ‘to comb’
kú-sóóbólól-à ‘to sort out’
b. k ú – s ó ó b ó l ó l – à
|
H

→ Second, a tone may spread and combine with the tone of an adjacent tone-bearing unit, resulting in a contour. In Yoruba, H and L never combine in bisyllabic words. Instead, the tone of the first syllable spreads onto the second syllable surfacing in either [L–LH] (11a) or [H–HL] (11b) (Yip 2002: 47), as illustrated in (11c).

- (11) a. /álá/ ‘dream’ → [álǎ] [Yoruba]
L–H L–LH
b. /rárâ/ ‘elegy’ → [rárâ]
H–L H–HL
c. r á r â
| |
H L

→ Thirdly, tone sandhi may involve spreading and delinking, i.e. a tone-bearing unit may lose its underlying tone. In Barasana (Tucanoan; Colombia) compounds, the last tone of the first part spreads onto the second part, be it H (12ab) or L (12c) (Gomez-Imbert & Kenstowicz 2000: 433). (12c) illustrates the delinking (=) and spreading process.

- (12) a. héá + gǎ́tǎ-ǎ́ → héáǎ́tǎ-ǎ́ ‘flint stone’ [Barasana]
 H-H L-H-L H-H-H-H-H
- b. héè + jáí → héèjàì ‘shaman (ancestor-jaguar)’
 H-L H-H H-L-L-L
- c. 

→ Similarly, in Lalana Chinantec (Oto-Manguenan; Mexico), a tonal harmony rule may spread a word-initial low (13a) or falling (13b) tone onto a following syllable (provided that the next syllable is stressed) (adapted from Yip 1989: 162).

- (13) a. rǎ – gwǎ:n (HL-L) → mǎ – rǎ – gwǎ:n (L-L-L) [Chinantec]
 ‘he goes to sleep’ ‘when he goes to sleep’
- b. mǎ – kǎn (L-L) → rǎ – mǎ – kǎn (HL-HL-L)
 ‘he takes care of it’ ‘he will take care of it’

→ All of the above examples exemplify word-internal sandhi, be it within a root (11) or within a morphologically complex word, as in (10), (12), and (13). Word-external sandhi phenomena are also attested and will be discussed below in the context of SL examples.

3 Lexical non-manual markers: mouthings

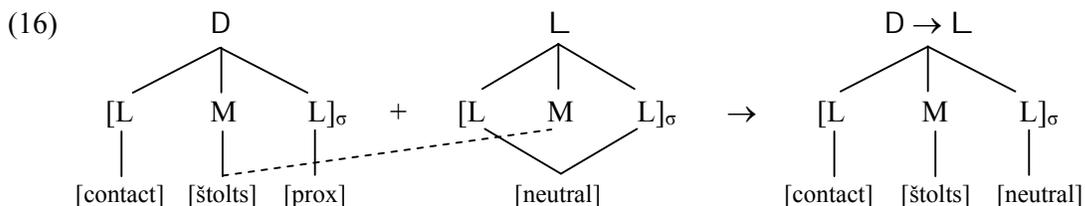
- In this section, I only consider mouthings (cf. also Crasborn, Adone et al.), implicitly assuming that other lexical non-manuals such as mouth gestures, facial expressions, and body leans (cf. Pfau & Quer, in press) show similar distributional patterns.
- In some SLs, mouthings commonly accompany lexical elements (mostly nouns) but may spread onto adjacent functional elements. This type of spreading is indicative of cliticization; it may be accompanied by manual changes (e.g. handshape assimilation).
- This phenomenon is referred to as *prosodic binding* (Boyes Braem 2001) or *prosodic linking* (Pfau 2006); the relevant prosodic domain is the prosodic (or phonological) word (Sandler 1999ab; Nespór & Sandler 1999).
- In the DGS example (14a), e.g., the mouthing associated with the adjectival predicate spreads onto the sentence-final agreement auxiliary PAM (Steinbach & Pfau 2007: 323).
- Crasborn et al. (2008) compare spreading of mouth actions in NGT, BSL, and SSL. They find that in NGT and BSL spreading almost exclusively proceeds rightwards (progressive) while in SSL, a fair amount of leftward (regressive) spreading is observed.
- In the NGT example (14b), we observe three instances of progressive spreading of mouthings from lexical onto functional signs; in the SSL example (14c), a mouthing spreads onto a preceding pointing sign (Crasborn et al. 2008: 59).

- (14) a. $\frac{\text{/}\check{s}\text{tolts/}}{\text{INDEX}_1 \text{ POSS}_1 \text{ BROTHER INDEX}_{3a} \text{ PROUD}^1 \text{ PAM}_{3a}}$ [DGS]
 'I am proud of my brother.'
 $\frac{\text{/do:p/} \quad \text{/j\text{ɔ}:\eta\text{ɛ}n/} \quad \text{/wo:n/}}{\text{VILLAGE INDEX BOY PERSON LIVE INDEX}}$
 b. [NGT]
 'There was a boy who lived in a village.'
 $\frac{\text{neg}}{\text{INDEX}_1 \text{ UNDERSTAND}}$ [SSL]
 c. 'I don't understand.'

- Hence, what we observe in (14) is spreading of a suprasegmental marker under cliticization. Since cliticization is post-syntactic, spreading is not constrained by syntactic hierarchy. A mouthing, for instance, may also spread onto a right-dislocated pronoun.
 → In (9), I cited a Yoruba example in which a tone spreads from a clitic onto a stem. More interesting in the present context are cases in which tone spreads from a host onto a clitic.
 → In Degema (Niger-Congo; Nigeria), clitics (and affixes) are toneless and are prosodically integrated within the host they attach to; see the examples in (15) (Kari 2002: 94, 99).

- (15) a. m^ó=m^{ón} m^é [Degema]
 3.SG.PROCL=see me
 'S/he will see me.'
 b. má=gá jí ínínə
 2.PL.PROCL.Q=EMPH.AUX come today
 'Are you really going to come today?'

- However, at least some of the mouthing cases are different in that the resulting prosodic word is phonologically reduced. In (14), e.g., the resulting host-clitic combination is monosyllabic; see the simplified representation in (16).



- In (17), I cite a comparable example from Yoruba, in which we observe tone spreading in combination with the deletion of segmental material (Akinlabi & Liberman 2001).

- (17) a. wá (H) + ọ̀nọ̀ (L-L) → wọ̀nọ̀ (H-L) [Yoruba]
 look (for) way 'look for a way'
 b. wá (H) + ọ̀wó (M-H) → wówó (H-H)
 look (for) money 'look for money'

- Occasionally, a mouthing spreads from one lexical element onto another and binds/links a prosodic unit larger than a prosodic word; see (18ab) for SSL and BSL examples (Crasborn et al. 2008: 61f) and (18c) for a DSGS example (Boyes Braem 2001: 117).

- (18) a. $\frac{\text{/tyst/}}{\text{SILENT BREATHE}}$ [SSL]
 'breathe silently'

- b. /will/
WILL WIN AT-LAST [BSL]
'Will win in the end.'
- c. /arbaitn/
INDEX₁ GO-TO INDEX₁ WORK INDEX GO-THERE [DSGS]
'I went to where I work.'

→ However, these cases appear rather exceptional. Crasborn et al. assume that in these cases, the mouthing marks a larger prosodic unit, the phonological phrase. Alternatively, one might consider such examples as instances of bimodal code-blending (see Van den Bogaerde & Baker 2005; Emmorey et al. 2008).

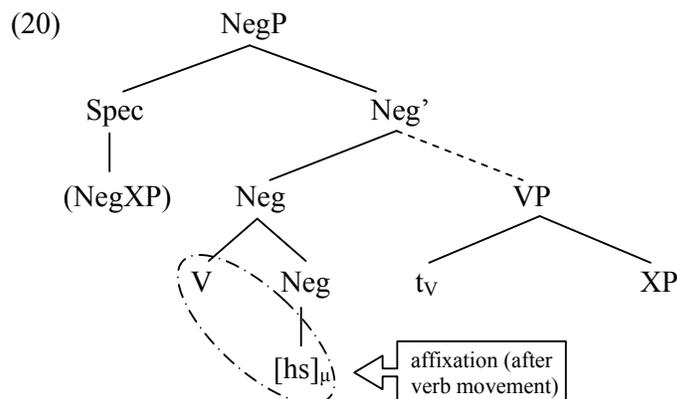
4 Non-manual morphemes

- In this section, I consider the negative headshake, i.e. a morphosyntactic marker, and non-manual adverbials, which could be analyzed as morphological or morphosyntactic.
- I assume that non-manual adjectives (e.g. diminutive) behave like adverbials. I will not discuss non-manual agreement since the status of the relevant NMMs (head tilt/eye gaze) is debated (Neidle et al. 2000; Thompson et al. 2006); also see Section 7.

4.1 Negative headshake

- In the literature, different accounts have been given for the negative headshake which expresses sentential negation. These accounts do not necessarily contradict each other since SLs may very well be typologically different.
- For DGS and LSC, Pfau (2002, 2008) and Pfau & Quer (2007) argue that the headshake is a featural affix (cf. Akinlabi 1996) which occupies the head of NegP.
- In both SLs, the affix needs a lexical host, Therefore, in syntax, the verb raises to Neg° to pick up the affix. As a result, the headshake accompanies the verb only (19) (note that I do not consider the optional manual Neg signs, which in both SLs follow the verb).

- (19) a. hs
POSS₁ MOTHER FLOWER BUY [DGS]
'My mother doesn't buy a flower.'
- b. hs
SANTI MEAT EAT [LSC]
'Santi doesn't eat meat.'



- That is, in these two SLs, negation involves head movement and affixation of a suprasegmental feature, as illustrated in (20). Note that in the present context, I neglect the right/left-headedness issue (see e.g. Pfau & Quer 2002, 2007; Geraci 2005).
- In spoken languages, tone change within a verb stem are sometimes attested in combination with negative particles or affixes; see Pfau (2002, 2008) for examples (e.g. Twi, Gã – both Ghana). However, cases in which negation would be realized by tone change only, i.e. cases comparable to (19), are rare if not non-attested.
- The only examples we find have a somewhat exceptional status. In Ógbrù (Kwa; Ivory Coast), negation is usually realized by the post-verbal particle *mú* in combination with a high-tone featural affix which attaches to the aspectual morpheme *ò* (21ab).
- Due to a general tonal constraint against the appearance of three successive high tones, however, the Neg particle never appears in sentences with monosyllabic high-tone verbs. Consequently, in (21d) negation is realized by a tone change only (Mboua 1999: 15f).

- (21) a. Kirí ò búkù òkókò [Ógbrù]
 Kéré ASP ask.for.RES banana
 ‘Kéré has asked for the banana.’
- b. Kirí ó búkù mú òkókò
 Kéré ASP.NEG ask.for.RES NEG banana
 ‘Kéré has not asked for the banana.’
- c. Kirí à pá òkókò
 Kéré ASP buy.RES banana
 ‘Kéré has bought bananas.’
- d. Kirí á pá òkókò
 Kéré ASP.NEG buy.RES banana
 ‘Kéré has not bought bananas.’

- In DGS and LSC, the negative headshake is capable of spreading. In (19), e.g., it may optionally spread over the direct object FLOWER/MEAT. Spreading must target entire constituents; non-pronominal subjects usually fall outside the scope of the headshake.
- Keeping with the analysis sketched above, Pfau (2002, 2008) suggests that spreading of the headshake is comparable to external tone sandhi phenomena in spoken languages. In external tone sandhi, a tone value spreads across a word boundary.
- In the Setswana (Bantu; Botswana) example in (22b), we observe progressive H-spreading. The words *bàthò* (‘persons’) and *bàŋwì* (‘certain, some’) in (22a) have no high tone. In (22b), however, the high tone of the comitative prefix *lí-* (‘with’) spreads rightwards onto three successive syllables (Creissels 1998: 150).

- (22) a. bàthò (L-L) bàŋwì (L-L) [Setswana]
 persons certain
 ‘certain persons’
- b. lí-báthó (H-H-H) báŋwì (H-L)
 with-persons certain
 ‘with certain persons’

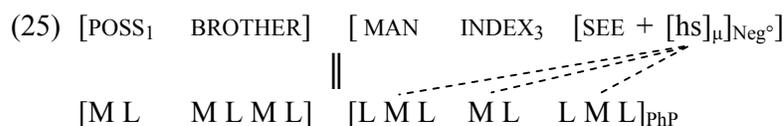
- In Tsonga (Bantu; South Africa), a high tone preceding a word with only low tones – *xikòxà* (‘old woman’) in (23a), *nhwànyànà* (‘girl’) in (23b) – spreads onto all syllables of this word except the last one (Baumbach 1987: 48).

- (23) a. xikòxà (L-L-L) → vá pfúná xikóxà (H-H-L) [Tsonga]
 old.woman they help old.woman
 ‘They help the old woman.’
 b. nhwányàna (L-L-L) → ú rhándzá nhwányána (H-H-L)
 girl he likes girl
 ‘He likes the girl.’

- The spoken language examples raise the question of what constitutes the relevant domain for headshake spreading. Crucially, in DGS/LSC, regressive spreading may target more material than just one adjacent sign (i.e. one adjacent syllable).
- I tentatively suggest that spreading of the prosodic marker headshake is confined to the phonological phrase (PhP), a prosodic domain situated between the prosodic word and the intonational phrase in the prosodic hierarchy (Nespor & Vogel 1986).
- This assumption may help us explain why headshake targets whole constituents and does not usually spread onto non-pronominal subjects and object relative clauses (RCs) both of which constitute separate PhPs (see Sandler (1999b) for RCs in Israeli SL).
- DGS RCs are head-external and follow the head noun (Pfau & Steinbach 2005). While spreading of headshake over the direct object is possible in (24a), the grammaticality of (24b) where the direct object MAN is modified by a RC is questionable.

- (24) a. $\overline{\hspace{10em}}_{\text{hs}}$
 POSS₁ BROTHER MAN INDEX₃ ₁SEE₃ [DGS]
 ‘My brother didn’t see the man.’
 b. ? $\overline{\hspace{10em}}_{\text{hs}}$
 POSS₁ BROTHER MAN (INDEX₃) [RELPRO₃ BOOK STEAL]_{RC} ₁SEE₃
 ‘My brother didn’t see the man who stole a book.’

- While prosodic constituents show systematic relations to syntactic constituent structure, they have been argued not to be isomorphic to syntactic constituents (Nespor & Vogel 1986; Truckenbrodt 1999).
- Spreading of the headshake affix onto movement segments within the PhP is illustrated for (24a) in (25). Note that headshake tends to be synchronized with manual movement.



- Note finally that a negative headshake may also spread onto right-adjacent functional elements, e.g. a post-verbal subject pronoun copy; see (26). I assume that in this case, just as with mouthings (cf. Section 3), the relevant domain is the prosodic word.

- (26) $\overline{\hspace{10em}}_{\text{hs}}$
 INDEX₁ POSS₂ FRIEND LIKE INDEX₁ [DGS]
 ‘I don’t like your friend.’

4.2 Non-manual adverbials

- Liddell (1980) was the first one to describe non-manual adverbials in some detail. He distinguished three adverbials, glossed as ‘mm’ (relaxed manner), ‘cs’ (proximity), and ‘th’ (lack of control, inattention); also see Bridges & Metzger (1996), Wilbur (2000).

→ Use of the first adverbial is illustrated by the NGT example in (27a), use of the third one by the ASL example in (27b) (Liddell 1980: 52; cf. also Lewin & Schembri).

- (27) a. $\overline{\text{mm}}$
 WOMAN FOREST(2h)₃ WALK₃ [NGT]
 ‘A woman is taking a walk through the forest in a relaxed manner.’
- b. $\overline{\text{th}}$
 INDEX₁ GO-ACROSS. WRONG, ACCIDENT [ASL]
 ‘I crossed the street carelessly. Whoops! There was an accident.’

→ Generally, non-manual adverbials do not spread beyond the predicate they modify (e.g. onto FOREST in (27a)). They do spread, however, in cases in which the predicate is reduplicated, as in (28a) (Liddell 1980: 42) and (20b).

- (28) a. $\overline{\text{mm}}$
 MAN FISH[continuous] [ASL]
 ‘The man is fishing in a relaxed manner.’
- b. $\overline{\text{mm}}$
 DUTCH PERSON++ ALWAYS BIKE++ [NGT]
 ‘The Dutch (people) always bike in a relaxed manner.’

→ Similarly, in spoken languages, the tone associated with a base may spread onto the reduplicant, as is illustrated in the Kirundi (Bantu; Burundi) examples in (29) in which adjectival reduplication expresses emphasis (Brassil 2003: 47).

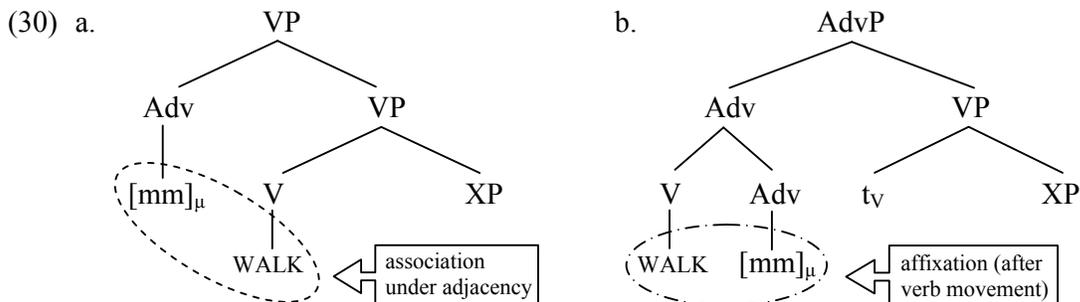
→ Note, however, that it is not always the case that the reduplicant is faithful to the base with respect to tone. In Kirundi verbal reduplication, for instance, the tone of the base is never copied.

- (29) a. /bà-tóó/ → bàtóó+bàtó [Kirundi]
 CL2-small small.EMPH
- b. mà-gúfi → màgúfi+màgúfi
 CL6-short short.EMPH

→ Given that adverbial non-manuals also combine with verbs, the question arises why, in contrast to the headshake, they cannot spread. Two scenarios are possible.

→ On the one hand, given that the relevant adverbials are typical VP-adverbials, we may assume that they adjoin to VP. Syntactically, the verb must be in (or must move into) a position sufficiently close to the adverbial to associate with it; see (30a).

→ Note that (30a) is structurally different from (20). Crucially, the non-manual and the verb are not combined under a single head. It might be argued that in such a configuration, a non-manual is generally incapable of spreading beyond the adjacent sign.



- On the other hand, non-manual adverbials could be argued to project (layered) adverbial phrases above VP (Cinque 1999) with the verb moving and adjoining to the adverbial head (30b). Obviously, this structure is reminiscent of (20).
- The impossibility of spreading in (30b) could be attributed to semantic factors. The adverbial non-manual, in clear contrast to the headshake, can only be interpreted as a verbal modifier.

5 Syntactic non-manuals

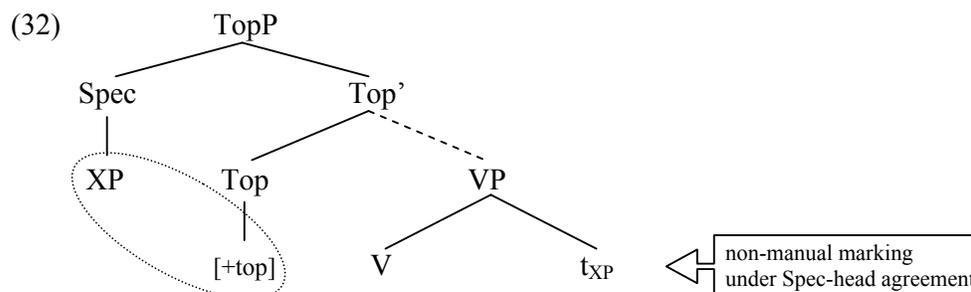
- Generally, syntactic non-manuals are the overt realization of abstract syntactic features residing in functional heads (Neidle et al. 2000; Pfau 2006).
- I will consider topics and yes/no-questions. Note that for ASL, negation has also been analyzed as a syntactic non-manual marker (Neidle et al. 2000). Pfau (2002) and Pfau & Quer (2002) relate different spreading behaviors to this difference in the nature of [+neg].

5.1 Topic marking

- Topics in SLs occupy a left-peripheral position and are commonly accompanied by raised eyebrows, sometimes in combination with specific chin and/or head positions (but cf. Sze for unmarked topics in HKSL).
- The ASL example (31a) (Aarons 1996: 66) and the NGT example (31b) contain topicalized DPs. In both cases, the topic is related to an element within the clause. In the LSC example (31c), a clause occupies the topic position (Quer 2004).

- (31) a. $\overline{\text{top}}$
 VEGETABLE, JOHN LIKE CORN [ASL]
 ‘As for vegetables, John likes corn.’
- b. $\overline{\text{top}}$
 POSS₁ BROTHER INDEX₃, EVENING INDEX₃ ₃VISIT₁ [NGT]
 ‘My brother, he will visit me tonight.’
- c. $\overline{\text{top}}$ $\overline{\text{hs}}$
 ARTICLE TODAY FINISH IMPOSSIBLE [LSC]
 ‘As for finishing the article today, that’s impossible.’

- Following Rizzi (1997), Aboh (2004), and others, I assume that the topic occupies a position within the left periphery of the clause, i.e. SpecTopP. I neglect the distinction between moved and base-generated topics and the possibility of topic stacking (cf. Aarons 1996; Puglielli & Frascarelli 2007).
- The head of TopP hosts a syntactic topic feature which is realized by the respective non-manual(s). The non-manual associates with the XP in SpecTopP under Spec-head agreement. Hence, in all cases, the whole XP is marked non-manually.



→ I further assume that non-manual marking under Spec-head agreement always defines an intonational phrase (IntP). More generally, this type of marking is characteristic of the non-manual realization of left periphery features.

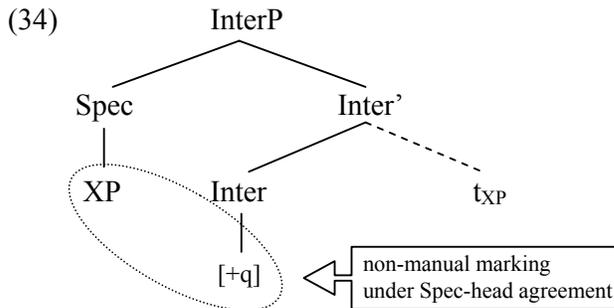
5.2 Marking of yes/no-questions

→ The question feature [+q] is another left periphery feature; it occupies the head of an interrogative phrase (InterP) (Rizzi 2001; Aboh 2004).

→ Liddell (1980) stresses the fact that a string is not well-formed if the non-manual y/n-marker (raised eyebrows) accompanies only part of the signed string that is questioned; cf. the examples from NGT (Coerts 1992: 193) and ASL (Liddell 1980: 3) in (33).

- (33) a. $\frac{\text{CAN USE ALWAYS INDEX}_2}{\text{y/n}}$ [NGT]
 ‘Can you always use it?’
- b. $\frac{\text{WOMAN FORGET PURSE}}{\text{y/n}}$ [ASL]
 ‘Did the woman forget her purse?’

→ Presumably, in y/n-questions, the [+q]-feature in Inter^o attracts the whole clause into its specifier (Wilbur & Patschke 1999; Aboh & Pfau, in press) and consequently, the whole clause is non-manually marked under Spec-head agreement, as illustrated in (34).



→ In some SLs, manual question particles may occupy the [+q]-head. In this case, the NMM may accompany the manual sign only, as in the HKSL example (35a) (Tang 2006: 206). Note, however, that even in the presence of a question particle, the NMM may extend over the whole clause, as in the NGT example (35b) (Smith 2004).

- (35) a. $\frac{\text{INDEX}_{2-1} \text{ FLY BEIJING Q-PART}}{\text{y/n}}$ [HKSL]
 ‘Will you and I fly to Beijing?’
- b. $\frac{\text{INDEX}_3 \text{ PARTY CANCEL Q-PART}}{\text{y/n}}$ [NGT]
 ‘Is the party cancelled?’

→ Typically, question particles occur sentence-finally. I therefore assume that the particle occupies Inter^o and that the non-manual associates with it. Still, the proposition moves to SpecInterP, with optional spreading of the non-manual under Spec-head agreement.

→ This analysis is similar to the one provide for the Gungbe example in (8b) by Aboh & Pfau (in press). In Gungbe, a low tone particle occupies Inter^o and attaches to the last syllable of the proposition in SpecInterP.

- The crucial difference between the Gungbe and the SL examples is that in Gungbe, the suprasegmental feature does not spread. Presumably, this is due to the fact that in Gungbe, the tone-bearing units are underlyingly specified for tone values. Hence, spreading of tone would require repeated delinking of tone values.
- In contrast, skeletal positions in SLs are not inherently specified for the relevant prosodic feature. Consequently, non-manual spreading does not imply a feature change. Rather, a prosodic feature is added to the featural make-up of a sequence of signs (Pfau 2008).
- The representation in (36b) illustrates the spreading process for the NGT sentence in (36a), in which a topic precedes a y/n-question. The topic, constituting its own IntP, is outside of the spreading domain of the prosodic marker associated with [+q].

(36) a. $\frac{\text{top}}{\text{/pa:rd/}} \quad \frac{\text{y/n}}{\text{/a:i/} \quad \text{/dyrf/}}$
 HORSE INDEX₃, INDEX₂ STROKE₃ DARE^INDEX₂ [NGT]
 ‘As for the horse, do you dare to stroke it?’

b. [HORSE INDEX_{3a}]_{Top} [INDEX₂ STROKE_{3a} DARE^INDEX₂ [+q]_{Inter°}]_{InterP}
 \parallel
 [M L M L M L]_{IntP} [M L M M M L M L]_{IntP}

- (36a) also illustrates the layering of prosodic non-manuals. Note that the sentence-final INDEX cliticizes to the verb and that the mouthing associated with DARE (*durven* in Dutch) spreads onto the clitic (cf. (16)).
- Lack of tone spreading thus distinguishes the Gungbe example from the SL examples. Still, tone spreading across multiple words is not unattested in spoken languages.
- In Huave (isolate; Mexico), H spreads rightward off a stressed syllable within XPs; the domain of spreading being VP or IP/CP. (37a) illustrates the tone values for the isolated forms, (37b) shows the tone values for the elements when combined in a sentence. The spreading process is further illustrated in (37c) (Noyer 1992; in Yip 2002: 225).

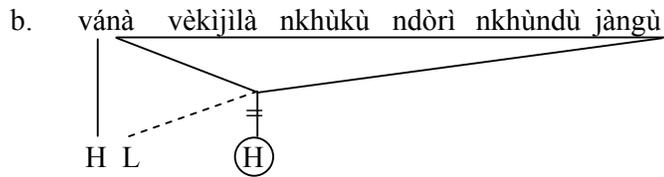
(37) a. tà.hà.wáw / ná.kánc / ò.lám [Huave]
 L L H L H L H
 ‘they saw’ ‘red’ ‘sugar cane’

b. tà.hà.wáw ná.kánc ó.lám
 L L H H H H H
 ‘They saw red sugarcane.’

c. t à . h à . w á w n á . k á n c ó . l á m
 $\begin{array}{ccccccc} | & | & | & & & & \\ \hline L & L & H & & L & H & L & H \end{array}$

- For Kipare (Bantu; Tanzania), Odden (1995: 462f) describes an instance of across-the-board lowering. Underlyingly, each word in (38a) contributes only high tones.
- At the phrasal level, adjacent Hs combine into one multiply-linked H. Odden further assumes the presence of a floating L tone. Across-the-board lowering is the result of delinking of the multiply-linked H and subsequent L-spreading (38b).

(38) a. /vá'ná vékíjílá nkhúkú ndóri nkhúndú jángú/ [Kipare]
 H H H H H H H H H H H H
 children while.3PL.eat chickens little red my



‘while the children eat those little red chickens of mine’

- I suggest that the SL cases discussed above are instances of across-the-board spreading whereby spreading (i) is constrained by prosodic phrasing and (ii) is facilitated by the fact that the relevant skeletal positions are not underlyingly specified for prosodic features.
- Further constructions in which XPs are non-manually marked within the left periphery under Spec-head agreement include wh-questions (Aboh et al. 2005; Aboh & Pfau, in press), conditionals (Wilbur & Patschke 1999), imperatives (Pfau 2006).

6 Conclusion

- Non-manual markers in SLs are suprasegmental, i.e. they constitute a layer on top of the sign skeleton. They behave like tones in spoken languages: they associate with sonorant syllable positions and they are capable of spreading.
- Spreading domains, however, differ from one NMM to the other. I have argued that all relevant domains can be defined in prosodic terms.
- Mouthings spread onto (right- or left-adjacent) functional elements under cliticization; the relevant prosodic domain is the prosodic word. Given that cliticization is post-syntactic, spreading is not constrained by syntactic hierarchy.
- Syntactic non-manuals are the realization of features that reside in functional heads in the left periphery. They associate with XPs in their specifier under Spec-head agreement and they define intonational phrases.
- Non-manual morphemes show a more variable behavior. I have argued that (in some SLs) the headshake is a featural affix that attaches to the verb after head movement. Spreading is optional and targets a phonological phrase or a prosodic word.
- The fact that non-manual adverbials do not spread (with the possible exception of clitics) is either due to structural (adjunction to VP) or semantic (verb modifiers) differences.
- A comparison to tone sandhi phenomena in spoken languages revealed interesting parallels. Still, there are also modality-specific features: (i) NMMs can be layered and (ii) spreading appears to be less constrained – at least for headshake and syntactic NMMs.

7 Appendix: Non-manuals that don’t spread

- All of the NMMs discussed previously are capable of spreading – and be it just onto a reduplicant or an adjacent functional element. However, there are also non-manuals that cannot spread. Let us first have another look at the headshake.
- DGS and LSC (Section 4.1) are non-manual dominant SLs: negation can be expressed by a NMM alone. In contrast, manual-dominant SLs require the presence of a manual Neg sign (Zeshan 2006a). In LIS, for instance, a sentence-final Neg sign is obligatory and the headshake cannot spread over the verb or the VP (39a) (Geraci 2005).
- Hence, it seems likely that the headshake in LIS is lexical, i.e. a phonological part of the Neg sign. It would be interesting to know whether headshake, like other lexical NMMs, can spread onto adjacent functional elements (as in (26); see Zeshan (2006b) for TĪD).

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