The Grammar of Headshake: A Typological Perspective on German Sign Language Negation[1]

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Sentential negation in German Sign Language (DGS) is particularly interesting, because it involves the combination of a manual and a non-manual element. The manual element is the negative particle NOT, the non-manual component is a side-to-side headshake which accompanies (at least) the predicate. In this paper, I argue that, despite this peculiarity, DGS fits neatly into the typological scheme that has been proposed on the basis of negation patterns attested across spoken languages. In particular, I claim that DGS shows split negation whereby a negative particle is combined with a negative affix. This negative affix, however, is featural in nature and triggers a prosodic change comparable to tone changes in tone languages. Data from a number of African languages illustrate that similar prosodic modifications are also attested in spoken language negation.

1   Introduction

Negation in natural languages comes in many different shapes. Crosslinguistically, we observe differences concerning the morphological character of the negation marker as well as concerning its structural position within a clause. For instance, while many languages make use of an independent negative particle (e.g., Dutch and English), in others, the negation marker is affixal in nature and attaches to the verb (e.g., Turkish). Moreover, some languages make use of a combination of two negative elements in order to express sentential negation (e.g., French).

Extensive research has been done on typological variation in the realization of sentential negation (for example, Croft 1991; Dahl 1979, 1993; Horn 1978; Hovdhaugen and Mosel 1999; Kahrel and Van den Berg 1994; Payne 1985). To the best of my knowledge, however, the available studies on

negation are dealing with spoken language negation only. Given that sign languages are natural languages and given that – despite the use of a different language modality – they have been shown to share many interesting properties with spoken languages on the phonological, morphological, and syntactic level, the question arises: How do sign languages fit into the typological scheme? Do they fit at all?[2]

In the following, I shall focus on German Sign Language (*Deutsche Gebärdensprache*: DGS). Sentential negation in DGS (as in all other sign languages studied to date) is quite intriguing because it involves the combination of a manual and a non-manual signal, namely the manual negation sign NOT and a headshake, which simultaneously accompanies (at least) the predicate of the sentence. Crucially, this headshake is not a mere gestural element but rather an integral part of the grammar of the language. A comparable constellation is, of course, not attested in spoken languages. Despite this peculiarity, I am going to claim that DGS fits well into the typological scheme that has been proposed for spoken language negation. On the basis of some interesting parallels between the DGS pattern and negation patterns as attested in a number of spoken languages, I will conclude that the proposed typology is modality-independent.

The paper is organized as follows. I will start off in Section 2 by presenting a typological sketch of spoken language negation; this sketch also includes a discussion of split negation phenomena. I will turn to DGS negation in Section 3. Following a brief description of the data collection in Subsection 3.1, I will sketch the basic DGS negation patterns in Subsection 3.2. Since headshake plays a crucial role in DGS negation, I will briefly discuss the linguistic versus affective use of headshake in Subsection 3.3. In Section 4, I will first propose an analysis for the DGS negation data which involves prosodic modification (Subsection 4.1), before relating the DGS examples to selected negation data from spoken languages in which prosody has also been found to play a crucial role (Subsection 4.2). An additional complexity, namely the possibility of non-manual spreading, will be discussed in Subsection 4.3. In Subsection 4.4, I will point out certain differences between prosodic modification in spoken and signed languages. Finally, in Section 5, I will

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[2] For overviews of the linguistic structure of specific sign languages, I refer the reader to Valli and Lucas (1992) for American Sign Language, Sutton-Spence and Woll (1999) for British Sign Language, Johnston and Schembri (2007) for Australian Sign Language, and Meir and Sandler (2008) for Israeli Sign Language. An introductory textbook that draws on data from various sign languages is Baker, van den Bogaerde, Pfau, and Schermer (2008). Sandler and Lillo-Martin (2006) discuss aspects of sign language grammar from a theoretical point of view and also focus on issues of universality and modality-specificity. For modality-specific and modality-independent aspects of sign language morphology and morphosyntax see also Meir (2002) and Aronoff, Meir, and Sandler (2005).

provide a further typological comparison by discussing selected negation data from other sign languages. In a nutshell, my central claims with respect to DGS negation are (i) that DGS has split negation, (ii) that DGS combines a negative particle with a negative affix, and (iii) that the negative affix is featural in nature and triggers a prosodic change comparable to a tone change in spoken languages.

2   A typology of spoken language negation

2.1   *Particles, affixes, and auxiliaries*

According to the comprehensive typological studies by Dahl (1979) and Payne (1985), there are three ways of expressing sentential negation in spoken languages: negative particles, negative affixes, and negative auxiliaries.

　　　As is well known, independent negative particles find use in, for instance, Dutch and English. In Dutch matrix clauses, the particle *niet* ('not') usually appears in sentence-final position (1b) or before a sentence-final infinitival or participle form in case a modal or auxiliary verb is used (1d) (negative elements are in bold face).[3]

(1)　a.　Ik begrijp 　　het antwoord 　　　　　　　　　　　[Dutch]
　　　　　I   understand the answer
　　　　　'I understand the answer.'

　　　b.　Ik begrijp 　　het antwoord **niet**
　　　　　I   understand the answer 　　not
　　　　　'I don't understand the answer.'

　　　c.　Wij kunn-en de auto kop-en
　　　　　we can-PL the car 　buy-INF
　　　　　'We can buy the car.'

　　　d.　Wij kunn-en de auto **niet** kop-en
　　　　　we can-PL the car 　not buy-INF
　　　　　'We cannot buy the car.'

In contrast, Turkish belongs to the class of languages with affixal/morphological negation. As can be seen in (2b), the negative suffix *-mI* (which is subject to

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[3] Note that the negative particle may also appear in other positions, for instance, in sentences with a prepositional complement, as, for instance, *Jan gaat **niet** naar school* ('Jan does not go to school').

vowel harmony) attaches to the verb stem; it is followed by tense and agreement suffixes.[4]

(2) a. Arkadaş-ım   üniversite-de buluş-du-m   [Turkish]
    friend-POSS.1.SG university-LOC meet-PAST-1.SG
    'I met my friend at the university.'

    b. Arkadaş-ım   üniversite-de buluş-**mu**-du-m
    friend-POSS.1.SG university-LOC meet-NEG-PAST-1.SG
    'I did not meet my friend at the university.'

The introduction of a negative auxiliary constitutes a third, yet less frequent, option for expressing sentential negation. Consider, for instance, the examples from Evenki, a Tungusic language spoken in Siberia, in (3). In the negative sentence (3b), the negative auxiliary *e* is introduced, which – just like other auxiliary verbs – takes over tense and agreement suffixes, while the main verb appears in a fixed participial form (Nedyalkov 1994: 2).

(3) a. Nuŋan min-du   purta-va   bū-che-n   [Evenki]
    he   1.SG-DAT knife-ACC give-PAST-3.SG
    'He gave me the knife.'

    b. Nuŋan min-du   purta-va   **e**-che-n   bū-re
    he   1.SG-DAT knife-ACC NEG-PAST-3.SG give-PART
    'He did not give me the knife.'

Consequently, there are three major means for the expression of sentential negation in spoken languages: particles, affixes, and auxiliaries. In the next section, I am going to show that some languages make use of a combination of two of the above mentioned negation strategies.

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[4] In other languages, the negative affix may be prefixal in nature; see, for instance, the Ewe and Háusá examples given in (6) and (7) below. Occasionally, negation may even be expressed by a circumfix, as is illustrated by the following examples from Wayãpi, a language spoken in French Guayana (Grenand 1980: 89).

  i. A-ɔu   takaka   ii. **N**-a-ɔu-**y**   takaka
  [Wayãpi]
    1.SG-drink   cassava.soup   NEG-1.SG-drink-NEG   cassava.soup
    'I drink cassava soup.'   'I don't drink cassava soup.'

  iii. Pɛ-pɔsikɔ-pa   iv. **N**ɛ-pɛ-pɔsikɔ-pa-**y**
    2.PL-work-COMPL   NEG-2.PL-work-COMPL-NEG
    'You have finished working.'   'You have not finished working.'

2.2   Split negation

One particularly intriguing characteristic of sentential negation is that in some languages, it comes in two parts, the presence of a second negative marker, however, not changing the polarity of the sentence back to affirmative. This phenomenon is commonly referred to as "split negation" or "negative concord".[5] The best-known language of this type is probably French, where the two negative particles *ne* and *pas* embrace either the modal verb (4b) or the lexical verb (4d).

(4)   a.   Il   veut   rest-er   à la   maison   [French]
            he   want.3.SG stay-INF at the house
            'He wants to stay at home.'

      b.   Il   **ne** veut   **pas**   rest-er   à la   maison
            he NEG want.3.SG NEG   stay-INF at the house
            'He doesn't want tostay at home.'

      c.   Nous oubli-er-ons   les   chose-s   désagréable-s
            we   forget-FUT-1.PL the.PL   thing-PL unpleasant-PL
            'We will forget the unpleasant things.'

      d.   Nous **n'** oubli-er-ons   **pas** les   chose-s   désagréable-s
            we   NEG forget-FUT-1.PL NEG the.PL   thing-PL unpleasant-PL
            'We will not forget the unpleasant things.'

Note that in some syntactic analyses of French negation (e.g., Pollock 1989; Ouhalla 1990), it is assumed that *ne* is not a particle but rather a prefix residing in the head of a functional projection (a negative phrase: NegP) and that in the syntax, the verb is raised and attaches to the negative prefix. However, since I am not concerned with the details of a possible syntactic derivation of negated

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[5] I avoid the term "double negation" because this term is mostly used for constructions in which the second negative element does change the polarity of the sentence (Baker 1970). Note that negative concord is also observed in some non-standard variants of English and German. The example in (i) is from Black English Vernacular (Labov 1969; cited in Pinker 1994: 29), the example in (ii) from Southern Bavarian.

   i.   *Tha's bullshit, 'cause you **ain't** goin' to **no** heaven*   [Black English Vernacular]

   ii. *I   hob   **koan** Schnaps **net** bschtell-t*   [Southern Bavarian]
         I   have   no   schnaps   not   order-PART
         'I didn't order Schnaps.'

structures, I shall not discuss this issue any further (but see Pfau (2002) for details).

Afrikaans is another example of a language that makes use of a double particle construction. Negative sentences in Afrikaans, however, are remarkable in two respects: firstly, both particles follow the verb – a pattern which, according to Dahl (1993), is quite unusual crosslinguistically. Secondly, the two particles are phonologically identical (5b). What is interesting about the example in (5d) is that the second particle follows the embedded clause although it is the matrix clause that is negated (Donaldson 1993: 402f).

(5)   a.   Ek   ken   daardie   man   [Afrikaans]
            I   know.1.SG   that   man
            'I know that man.'

      b.   Ek   ken   **nie**   daardie   man   **nie**
            I   know.1.SG   NEG   that   man   NEG
            'I don't know that man.'

      c.   Ek   het   geweest   dat   hy   sou   kom
            I   have   know.PART   that   he   would   come.INF
            'I knew that he would be coming.'

      d.   Ek   het   **nie**   geweest   dat   hy   sou   kom   **nie**
            I   have   NEG   know.PART   that   he   would   come.INF   NEG
            'I didn't know that he would be coming.'

Another widespread option for the realization of split negation is the combination of a negative particle with a negative affix (remember that possibly French is of that type, too). This strategy is exemplified by the Ewe example in (6b). In Ewe, a Western Sudanic language spoken in Togo, a negative prefix attaches to the verb stem and a negative particle appears in sentence-final position (Bole-Richard 1983: 307).

(6)   a.   Kɔkú   sà-nà   sìgâ   [Ewe]
            Kokou   sell-HAB   cigarette
            'Kokou sells cigarettes.'

      b.   Kɔkú   **mú**-sà-nà   sìgâ   **ò**
            Kokou   NEG-sell-HAB   cigarette   NEG
            'Kokou does not sell cigarettes.'

Things are somewhat different in Háusá, a Chadic language spoken in Northern Nigeria. In this language, the first negative marker, the low-toned prefix *bà-*, attaches to a functional complex, which also comprises agreement and tense/aspect-morphemes. The verb itself is not inflected at all and the negative particle, a high-toned *bá*, appears – just as in Ewe – in sentence-final position (7b) (Hartmann 1999).[6]

(7)   a.   Kàndé tá-kàn   dáfà kíífíí   [Háusá]
            Kandé 3.SG.F-HAB cook fish
            'Kandé usually cooks fish.'

       b.   Kàndé **bà**-tá-kàn   dáfà kíífíí **bá**
            Kandé NEG-3.SG.F-HAB cook fish   NEG
            'Kandé usually doesn't cook fish.'

I want to conclude this typological survey with a quite unique pattern, which is observed in the Austronesian language Lewo. In order to express negation, this language makes use of three overt negative markers, one of which appears preverbally, one postverbally, and the third sentence-finally. Early (1994) tentatively claims that the first Neg element *pe* is a negative auxiliary (which may be dropped in the speech of younger speakers), while the second (*re*) and the third marker (*poli*) are particles. This extravagant strategy is exemplified by the negative sentence in (8b) (Early 1994: 67).[7]

(8)   a.   Naga   ø-pisa   suniena tai   [Lewo]
            he   3.SG-R.say story   ART
            'He told a story.'

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[6] Hartmann (1999) also provides evidence which shows that the preverbal functional complex as a whole cannot be analyzed as being affixal in nature. In particular, certain emphatic and adverbial particles may appear between the functional complex and the verb.

[7] In Limbu, a language spoken in Eastern Nepal, there are instances in which three negative affixes attach to a verb stem. The first and second negative affix (the prefix -*mɛ* and the suffix -*n*) are obligatory in all negated forms, whereas the third negative affix (the suffix -*n*) is lacking in some forms, is optional in others, and obligatory in verbs with first person singular subject and third person plural object, as is the case in example (i) (van Driem 1987: 97; NPT=non-preterit, nsP=non-singular patient).

    i.   ***mɛ**-dum-ʔɛ-**n**-chi-**n**-ø*   [Limbu]
        NEG-run.into-1.SG.S/3.PL.O/NPT-NEG-nsP-NEG-PERF
        'I won't run into them.'

b. Naga **pe**   ø-pisa   **re**   suniena tai   **poli**
  he   NEG   3.SG-R.say   NEG   story   ART   NEG
  'He didn't tell a story.'

On the one hand, the above examples make clear that natural language negation comes in different shapes, that is, as an independent particle, an affix, or an auxiliary. On the other hand, the examples illustrate that negation may also come in varying quantity, so to speak: as simple, as split, and even as triple negation. In the next section, I will introduce the basic patterns of sentential negation in DGS and I will consider if and how DGS negation, that is, negation in a different language modality, fits into the typological picture.

3   Sentential negation in German Sign Language (DGS)

As mentioned before, sentential negation in DGS is interesting because it involves a manual sign as well as a non-manual element, a side-to-side headshake. In this section, I will first say a few words about how the data were collected. In Subsection 3.2, I will present some representative DGS negation data. An aspect that is particularly important in the present context, namely the differences between a linguistic and an affective use of headshake, will be briefly discussed in Subsection 3.3.

3.1   Data collection

For this study, data were collected at the *Gehörlosenzentrum* (Centre for the Deaf) in Frankfurt/Main with the help of three deaf informants. All three informants, two women and one man, are native sign language users and teachers of DGS at the *Gehörlosenzentrum*.

    The informants were presented with German sentences on file-cards that contained a negation and they were instructed to sign these sentences the way they would sign them in conversation with a deaf interlocutor. I want to point out that there are (at least) three potential methodological shortcomings this sort of data collection is confronted with.

    First of all, the data were collected by a hearing researcher. It is a well-known fact that the presence of a hearing researcher may have an influence on the sign language use of the informants. In particular, the informants may tend to adjust the syntactic structure of their utterances to that of spoken German. Due to their experiences as teachers of DGS, however, the informants are used to interact with hearing people and are aware of the grammatical differences. It was therefore unlikely for them to adjust their language use. In fact, it turned out

that the DGS utterances did not reflect the grammatical structure of German (for instance, with respect to the position of the verb and the manual Neg sign).

Secondly, the presentation of written stimulus material might also have an impact on language use. An alternative option for eliciting negated sentences would have been to present pictures showing certain situations. One might, for instance, present a picture showing a woman buying books and then ask the informant "Does the woman buy flowers?" For the present study, however, this elicitation method turned out to be problematic. First of all, the informant is not forced to respond with a negated sentence; rather, it is likely that s/he answers "The woman buys books". Moreover, by means of a picture, a certain context is created, that is, it is quite possible that we are not dealing with sentential negation but with constituent negation (e.g. "The woman does not buy flowers, but books"). Constituent negation in DGS probably has characteristics different from sentential negation and it is not the topic of the present study. In order to prevent the use of constituent negation, it was decided to present written sentences without any context.

This brings us to the third problematic point. Obviously, sentences in isolation do not reflect natural language use. Just as words in spoken languages, signs may undergo formal changes in a given discourse context due to prosodic and pragmatic factors. Such factors were not taken into account in the present study. I still assume that the basic patterns described in the following section, in particular, the distribution of manual and non-manual markers, also hold for sentences uttered in discourse contexts.

Finally, I want to point out that I will also discuss some ungrammatical DGS examples in Section 4. Of course, these data were not obtained by means of the elicitation task. Rather, these examples were constructed and their grammaticality was discussed with the informants.

3.2 The DGS data

DGS is a SOV language (Keller 1998; Pfau and Glück 2000; Rathmann 2000). In contrast to what is observed in spoken German, there are no matrix/embedded clause asymmetries with respect to the position of the finite verb.[8] The manual

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[8] It is important to point out that in DGS (as well as in other sign languages), different verb types have to be distinguished with respect to their agreement properties (Padden 1988). Most DGS verbs – the so-called "plain verbs" – do not agree with any of their arguments; this is true, for instance, for the verb BUY in (9ab): irrespective of the person and number features of the subject NP, the verb always looks the same.

A small number of verbs, however, agree with their subject and object by means of a spatial modification of the sign; HELP in (9cd) is a verb of this type. For these "agreement verbs", the movement of the sign proceeds from the spatial location associated with the

negative (Neg) element NOT is one of the few signs that may follow the verb (and – if present – the modal verb). This post-predicative position is also the only position which the Neg-element may occupy. In most cases, this position is also the sentence-final position since the only elements that may follow NOT are wh-signs (and possibly the free aspectual marker READY). In examples (9b) and (9d), NOT does indeed appear in sentence-final position. The brackets indicate that the use of the manual Neg marker is optional. In contrast, the non-manual element, a side-to-side headshake, is obligatory. In the presence of NOT, the headshake is performed simultaneously and continuously with the negative sign and the verb sign; in the absence of NOT, the headshake accompanies the verb sign. Also note that negated sentences are usually accompanied by a specific facial expression (furrowed eyebrows, frown), which is not indicated in the below figures.[9]

(9) a. WOMAN FLOWER BUY   [DGS]
          'The woman buys a flower.'

                         hs (__hs)
     b. WOMAN FLOWER BUY **(NOT)**
          'The woman does not buy a flower.'

     c. DOCTOR INDEX$_{3a}$ MAN INDEX$_{3b}$ $_{3a}$HELP$_{3b}$
          'The doctor is helping the man.'

                              hs (__hs)
     d. DOCTOR INDEX$_{3a}$ MAN INDEX$_{3b}$ $_{3a}$HELP$_{3b}$ **(NOT)**
          'The doctor doesn't help the man.'

The negated sentences (9b) and (9d) are schematically visualized in Figures 1 and 2, respectively. Figure 1 gives the realization with the manual marker NOT

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subject towards the location associated with the object. These locations are either the actual locations of referents present in the discourse situation or locations that were established previously in the discourse for non-present referents by means of the pointing sign INDEX. In (9c), for instance, the noun phrase DOCTOR is linked to the point 3a somewhat to the right of the signer in neutral signing space. Consequently, the movement of the verb sign proceeds from this point towards the location of the addressee MAN (see Neidle et al. (2000), Pfau and Glück (2000), Liddell (2000), Mathur (2000), Mathur and Rathmann (2002), Meir (2002), and Zwitserlood and van Gijn (2006) for different accounts of sign language agreement systems).
[9] Sign language examples are given in English small caps. Subscript numbers refer to points in the signing space, identical numbers identifying identical points. Lines above (sequences of) signs indicate the stretch (scope) of a particular non-manual marker, here, of the negative headshake (hs). Reduplication of a sign, for instance, to express pluralization, is indicated by "++"; a sign-clitic combination is indicated by "^".

(which is signed with a 1-handshape (extended index finger) that executes a sideward movement), while Figure 2 shows the option without NOT. Obviously, these figures only give a very rough idea of what the signed sequences actually look like. In both figures, the negated predicate – BUY in (9b), HELP in (9d) – is illustrated by two pictures in order to also visualize the headshake which accompanies the sign. In the first picture, the start hand configuration and position is shown, in the second picture, the end configuration and position. Similar to other non-manual movements (and even mouthings), the headshake tends to be synchronized with the manual movement, that is, the head and the hand(s) are moving in parallel. That is, in Figure 1, the head moves from one side to the other while the dominant hand (that is, the hand the signer uses in one-handed signs) moves downward. Note that the optional sign NOT is also accompanied by a headshake. This headshake, however, is part of the lexical entry of the sign. When NOT is signed, the headshake is continuous: the head goes back to its original position while the hand moves to the start position of NOT and then, a second headshake accompanies the sideward movement of NOT. In the following figures, the optional manual element is not shown.

| | | hs | hs |
| WOMAN | FLOWER | BUY | NOT |
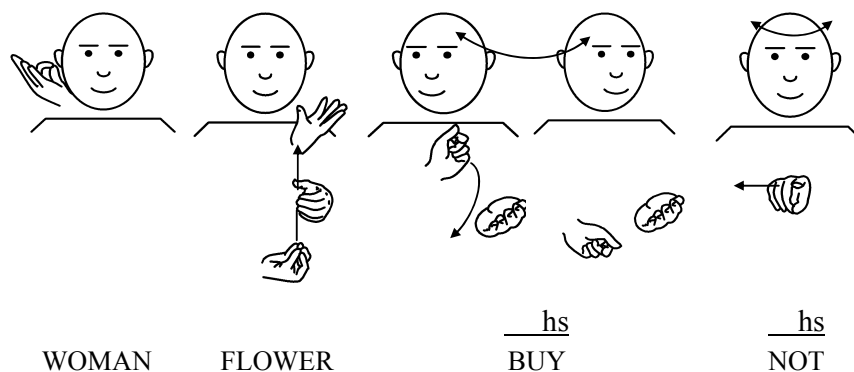
Figure 1: Negation with plain verb in sentence (9b)

| | | | | hs |
| DOCTOR | INDEX$_{3a}$ | MAN | INDEX$_{3b}$ | $_{3a}$HELP$_{3b}$ |
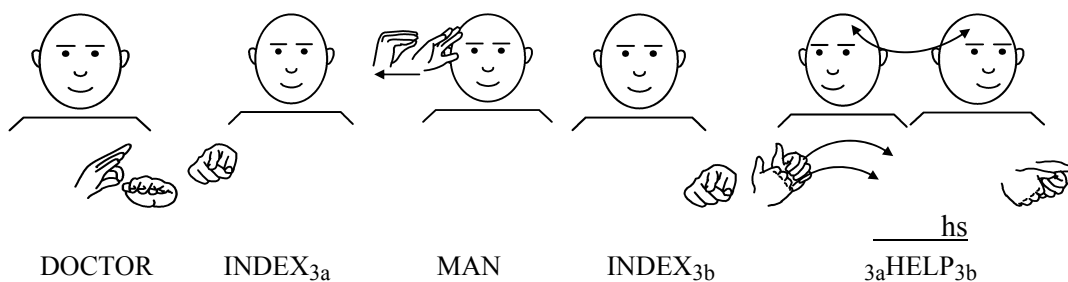
Figure 2: Negation with agreement verb in sentence (9d)

The combination of an optional manual element with a non-manual component is a recurrent pattern in the expression of sentential negation that has been described for many unrelated sign languages (see Zeshan (2004) for a

typological overview). The phonological form as well as the position of the manual element within the clause, however, may differ from sign language to sign language. For instance, in American Sign Language (ASL), which – according to Neidle et al. (2000) – has a basic SVO word order, the word order in a negative clause is S-Neg-V-O while in DGS it is S-O-V-Neg (as illustrated in (9bd) above). Moreover, the exact position and the scope of the non-manual marker may obey language-specific constraints.[10] I will come back to some of these typological aspects in Section 5.

Similar to many spoken languages such as, for example, Russian and Turkish, DGS does not have a copula verb. Consequently, in sentences with adjectival or nominal predicates, the negative headshake gets associated with the adjectival or nominal predicate, respectively. This is illustrated for the adjective NICE in example (10a) and Figure 3 and for the noun DOCTOR in example (10b) and Figure 4. As before, the sentence-final manual Neg element is optional.

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                         hs   (   hs)
(10)  a.  POSS₂ HAIRDO NICE   (NOT)                          [DGS]
          'Your hairdo is not nice.'
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                           hs   (   hs)
      b.  POSS₁ BROTHER  DOCTOR  (NOT)
          'My brother is not a doctor.'
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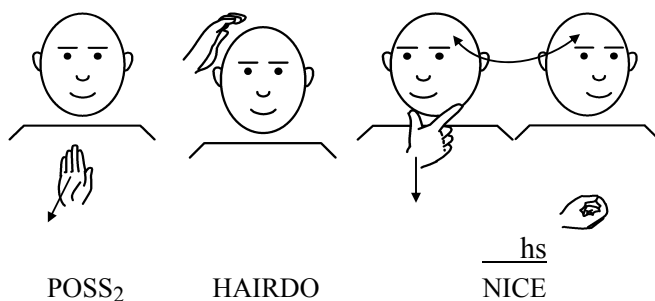

Figure 3: Negation with adjectival predicate in sentence (10a)

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[10] See Pfau (2002) for a syntactic account of the differences between DGS and ASL, which relies on the assumption that the head of NegP hosts different elements in the two languages. See Pfau and Quer (2002) for a comparison of DGS, ASL, and Catalan Sign Language along similar lines.

$$\text{POSS}_1 \qquad \text{BROTHER} \qquad \overline{\text{DOCTOR}}^{\text{hs}}$$
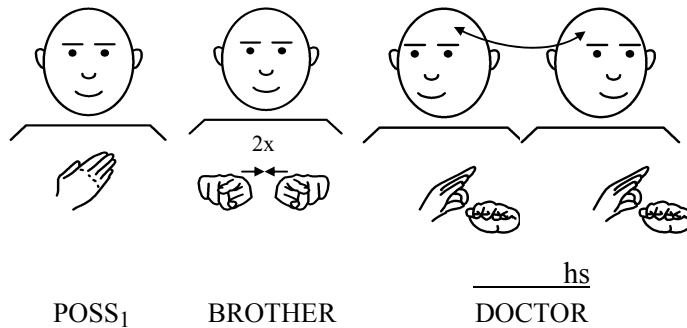
Figure 4: Negation with nominal predicate in sentence (10b)

As far as the DGS sign NOT is concerned, I assume that it is a negative particle. Crosslinguistically, the sentence-final placement of a negative particle is very common, in spoken languages (Dahl 1979) as well as in sign languages (Zeshan 2004); see, for instance the Ewe and Háusá examples given in (6) and (7) as well as further examples provided in Sections 4.2 and 5. On the other hand, the fact that the particle is optional is reminiscent of the situation in Colloquial French, where the Neg element *ne* is commonly dropped (Ashby 1981). Note, however, that there are instances of negative cliticization in which the manual negation marker NOT fuses with the preceding verb sign. In DGS, cliticization is obligatory with modal verbs. A similar patterns is familiar from English, of course (Zwicky and Pullum 1983) – one difference being though that in English, negative cliticization is common but not obligatory. In (11), I give two DGS examples involving negative modals. The illustrations in Figure 5 show that the modal verbs MAY and MUST are signed with a downward movement executed at the wrist joint. The phonological change imposed on their negative counterparts consists of an alpha-shaped movement, as can also be seen in Figure 5. In both examples, the headshake is co-articulated with the negative modal (see Pfau and Quer (2007) for a comparison of DGS and Catalan Sign Language and for syntactic analysis; see Shaffer (2002) for negative modals in ASL).

(11) a. GARDEN INDEX$_{3a}$ CHILD++ PLAY $\overline{\text{MAY}^\wedge\text{NOT}}^{\text{hs}}$ [DGS]
'The children may not play in the garden.'

b. GAME INDEX$_{3a}$ INDEX$_2$ $_2$EXPLAIN$_1$ $\overline{\text{MUST}^\wedge\text{NOT}}^{\text{hs}}$
'You don't have to explain the game to me.'
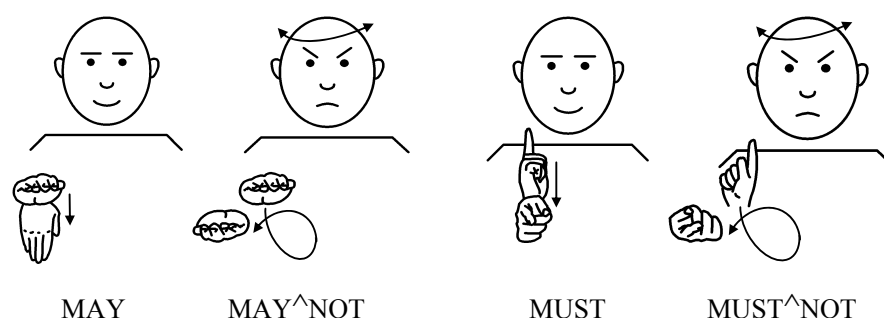
Figure 5: Negative modals in sentences (11a) and (11b)

Assuming that the above interpretation of facts is on the right track, that is, assuming that the sentence-final element NOT is indeed a particle, we are still left with the headshake. Apparently, this non-manual element confronts us with a situation that is at odds with the typological patterns presented in Section 2.

Before turning to the typological analysis I propose for sentential negation in DGS, a few words have to be said about the use of headshakes in spoken and signed languages. Above all, we need to make sure that the non-manual element which finds use in DGS negation is not just an affective expression but rather an integral part of the grammar of the language. This issue will be dealt with in the next subsection.

3.3   *Linguistic vs. affective use of headshake*

While communicating, speakers of spoken languages make extensive use of (possibly culture-specific) gestures, be it with their hands or by means of facial expressions or head movements. Headshakes, for instance, are frequently found to accompany spoken utterances, for instance, in order to intensify a negated sentence (Kendon 2002). As will become clear, however, the gestural use of headshake in spoken languages is qualitatively different from the linguistic use of headshake in DGS and other sign languages.

First of all, in clear contrast to the sign language data, it is impossible to negate a spoken sentence by headshake only (with the possible exception of pragmatically marked situations). That is, while the examples in (9b), (9d), and (10) are perfectly grammatical without the manual element NOT, an affirmative spoken utterance accompanied by a headshake cannot be understood as being negative in meaning. Hence, in example (12), the headshake alone is not capable of changing the polarity of the sentence. Note that in this example, the exact stretch of the non-manual is irrelevant.

$$\overline{\hspace{3cm}\text{hs}\hspace{1cm}}$$

(12)   * Your new hairstyle is nice
         (intended meaning: Your new hairstyle is not nice)

Secondly, as has already been mentioned above (and as will be further discussed below), the exact distribution of the negative headshake in DGS, that is, its onset and offset, is not random. Rather, the scope and the timing of the non-manual behavior is clearly linguistically constrained relative to the manual sign(s) it accompanies in a way that the gestural/affective headshake is not. As was shown by Baker-Shenk (1983) in her thorough study of other non-manual components in ASL, a grammatical facial behavior begins milliseconds before the manual sign and terminates milliseconds before the end of the manually signed string it accompanies. In contrast, the appearance of affective facial expressions in sign languages is not constrained in such a way. Rather, they may begin and end at any time regardless of the manually realized signs. Similarly, the scope of headshakes and affective facial expressions that accompany spoken utterances is not linguistically constrained.

As argued by Reilly and Anderson (2002: 163), a third difference concerns the intensity and continuity of the non-manual expression. In particular, "[g]rammatical facial signals reach apex intensity immediately and remain at apex for the duration of the signed string; in contrast, emotional expressions vary in their intensity and continuity and can wax and wane during the production of an utterance." In sum, only the production of grammatical facial signals and head movements is governed by linguistic rules, while the production of their affective counterparts is considerably more variable and not dependent on linguistic factors.

Still, most certainly, deaf signers also make use of non-manual gestures, and they borrow these gestures from the surrounding hearing population. McClave (2001: 67) points out that "[s]uch borrowing of gestures should not surprise us even though to date linguistic studies of borrowings have focused on the verbal". Interestingly, in spoken languages, gestural headshakes do not only accompany or intensify negated utterances. Rather, as has been shown for hearing (non-signing) Americans by McClave (2000, 2001), lateral headshakes are also found in non-negative contexts. On the one hand, they may signal uncertainty, for instance, when accompanying a wh-question, as in (13a) (McClave 2001: 61). On the other hand, a headshake may also serve to intensify an affirmative sentence, as is illustrated in (13b) (McClave 2000: 873).

$$\overline{\hspace{3cm}\text{hs}\hspace{1cm}}$$

(13)   a.   Where is he going?

$$\overline{ \text{hs}}$$

    b.   what I needed to do was uh to clean it and uh (pause) it was real bad

McClave (2001) also shows that ASL signers use lateral headshakes for similar reasons. In (14a), for instance, an ASL signer employs a headshake to signal intensification (McClave 2001: 57). A similar point is made by Zeshan (2004: 20), who cites the New Zealand Sign Language (NZSL) example in (14b), which indicates that a slow headshake may also be used in a context where it indicates a strong positive feeling (possibly expressing surprise or disbelief). Moreover, she gives one Norwegian Sign Language (NSL) example (Vogt-Svendsen 1990; in Zeshan 2004: 20), in which a headshake accompanies a wh-question (14c).

$$\overline{ \text{hs}}$$

(14) a.   WOW SHOW-UP MANY   [ASL]
            'Wow! Many (non-handed signs) showed up.'

$$\overline{ \text{hs}}$$

    b.   INDEX$_3$ BEAUTIFUL INDEX$_3$ [NZSL]
            'How beautiful that is!'

$$\overline{ \text{hs}}$$

    c.   BEFORE SCHOOL WHERE INDEX$_2$ [NSL]
            'Where did you go to school?'

Both McClave and Zeshan suggest that in the contexts in (14), the headshake does not fulfill a grammatical function.[11] They therefore propose that we are dealing with gestures, which are conventionalized among members of the hearing, non-signing community in comparable linguistic environments, as was shown in (13).

    Obviously, speakers as well as signers make use of gestural headshakes in certain pragmatically marked contexts. However, only in signed languages, such culture-specific gestures may grammaticalize on the syntactic level (see Section 5 for discussion of another culture-specific gesture). In its grammaticalized form, the headshake is subject to well-defined syntactic constraints and – in

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[11] As pointed out by a reviewer, the claim that the headshake does not fulfill a linguistic function in sentences such as (14a) and (14b) might be too strong. It might, for instance, well be the case that in these two sentences, the headshake is the non-manual realization of a focus feature. I agree with the reviewer but leave it to further research to uncover whether headshakes do in fact systematically appear in focus contexts.

contrast to a headshake which signals uncertainty or intensification – it is capable of changing the polarity of an utterance from affirmative to negative.[12]

Finally, the assumption that linguistic facial expressions are in fact qualitatively different from purely affective facial expressions was also corroborated in a number of neurolinguistic studies. It was shown, for instance, that while purely affective facial expressions are processed in the right hemisphere, linguistic facial expressions – just like other linguistic information – are processed in the left hemisphere (Corina 1989). Moreover, the two types of facial expressions can be selectively impaired. That is, following a lesion within the right hemisphere, some patients were no longer able to interpret affective mimics but could still understand the same non-manual when used linguistically. In contrast, left-lesioned patients showed the opposite pattern: they only had problems with the interpretation of linguistic facial expressions but were still able to process affective expressions (Poizner and Kegl 1992). The same is true for the production of linguistic versus affective facial expressions (Corina, Bellugi, and Reilly 1999).

4   Prosodic modification in negative contexts

Having introduced the basic patterns of sentential negation in DGS and having established that the negative headshake is not just an affective element, I shall now turn to the typological classification of DGS. In this section, I am going to argue for a modality-independent analysis of DGS negation by relating the DGS pattern to patterns as attested in some spoken languages. In Subsection 4.1, I present my typological analysis. Crucially, I propose to analyze the headshake as a prosodic feature which gets associated with the predicate. In Subsection 4.2, I will draw a comparison to spoken languages by showing that similar processes, that is, the involvement of prosodic modification in negation, are also attested in spoken languages. A further complication, the possibility of spreading of the headshake, is discussed in Subsection 4.3. In this context, too, I will present comparative data from spoken languages. An important aspect of my analysis is the idea that the headshake in DGS behaves like tonal features in spoken languages: it is autosegmental and it can spread. In section 4.4, however, I will point out some important differences between headshake and tone.

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[12] Janzen (1999) describes the grammaticalization of another non-manual in ASL, namely the use of raised eyebrows to signal topic marking. See Pfau and Steinbach (2006) for a survey of grammaticalization phenomena (involving manual and non-manual elements) across sign languages.

4.1   The headshake as a prosodic feature

Simultaneous non-manual marking has been shown to be common practice in all sign languages studied to date. It has therefore been proposed to include non-manuals in the phonological description of signs (e.g. Brentari 1998). Non-manual markers may serve functions at different grammatical levels (see Pfau and Quer (in press) for an overview). Firstly, some signs are lexically specified for a non-manual component, be it a mouth gesture or mouthing, a head movement, or a body lean (Boyes Braem and Sutton-Spence 2001; Wilbur and Patschke 1998). Secondly, a non-manual marking may combine with a manual sign in order to express an adjectival or adverbial modification (Liddell 1980). Thirdly, non-manuals like, for example, a brow raise may serve a syntactic function in that they accompany yes/no-questions, conditionals, and topicalized constituents (Liddell 1980; Wilbur and Patschke 1999; Neidle et al. 2000).

Recently, sign language research has begun to seriously investigate the claim that many instances of non-manual markings, in particular, facial articulations, may best be understood as fulfilling the role of intonation. It has, for instance, been shown that non-manuals systematically accompany prosodic constituents such as the Phonological Phrase and the Intonational Phrase and that they reliably change at prosodic constituent boundaries (Sandler 1999; Nespor and Sandler 1999). In other words: facial articulation may serve a prosodic function in sign languages and can therefore be compared to intonational contours in spoken language (Wilbur 2000).

Following this line of research, I propose to analyze the negative headshake associated with the verb (or the adjectival/nominal predicate, respectively) as a prosodic alteration imposed on a base form. Obviously, the negative headshake is a dynamic property of the signal, which is realized simultaneously with the manual string. The negative headshake can therefore be analyzed as an autosegment which behaves in a way similar to tonal prosodies in tone languages. As is well known, tonal prosodies, just like non-manual markers, may not only serve to distinguish otherwise identical lexical items, as in the example from Dagaare, a language spoken in Ghana in (15) (Yip 2002: 2). They may also have a morphological function by supplying, for example, aspectual or agreement information.

(15) a. yùòrí (LH)   b. yúórì (HL)   [Dagaare]
         'penis'   'name'

Moreover, tonal changes may have an effect on the level of syntax. The minimal pair in (16) from Gungbe, a Kwa language spoken in Benin, indicates that in this language, yes/no-questions require the presence of a sentence-final low tone.

The only difference between the two sentences is the high tone on the verb in the declarative sentence (16a) versus the high-low tone on the verb in the yes/no-question (16b). The latter 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).

(16) a. Sɛ́tɔ̀   kò   wá   [Gungbe]
          Seto   already   arrive
          'Seto arrived already.'

      b. Sɛ́tɔ̀   kò   wâ?
          Seto   already   arrive.INTER
          'Has Seto arrived yet?'
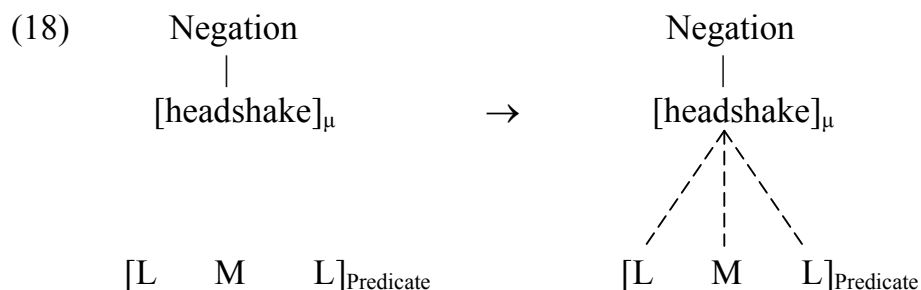
The prosodic change that accompanies negation in DGS can be accounted for in a straightforward way if we think of the non-manual Neg element as a featural affix that gets associated with a base form. I adopt the term "featural affixation" from Akinlabi (1996), who presents intriguing spoken language data in which free (floating) features function as morphemes. Obviously, such features have to be associated with a segmental base in order to be prosodically licensed. The most commonly found cases are those which involve a tone change, as in (16), but Akinlabi also presents data in which non-tonal features function as grammatical morphemes. In Nuer, a Nilo-Saharan language of Sudan, for instance, certain tense/aspect distinctions are realized by the features [continuant] and [voice], while in Terena, an Arawakan language of Brazil, the category of first person is marked through a process of progressive (left to right) nasalization, as is illustrated by the examples in (17) (Akinlabi 1996: 273).

(17) a. unae   →   ũnãẽ   [Terena]
          'boss'   'my boss'

      b. ɪwuʔɪšo   →   ĩwũʔĩⁿžo
          'he rides'   'I ride'

Consequently, the two Terena words at the right of the arrow can be analyzed as the left-to-right association of a base form with the feature [+nasal], which is an autosegment representing the morpheme for the first person singular. Example (17b) also shows that the nasalization process is subject to certain restrictions. In particular, obstruents, such as *š*, block spreading of [+nasal], but not before they

become prenasalized (and voiced). Consequently, the word-final vowel *o* is not nasalized.

In pretty much the same way, the feature [headshake] in DGS can be interpreted as an autosegment representing the Neg morpheme. Featural affixation associates the non-manual morpheme with the skeletal tier, as is illustrated in (18). Note that Sandler (1989) assumes that the skeletal structure of signs consists of locations (L) and movement (M) and that the L- and M-positions can be compared to C- and V-positions in spoken languages.[13]

(18)   Negation   Negation
               | |
          [headshake]$_\mu$ $\rightarrow$ [headshake]$_\mu$
                                                           ⇡
                                                      ⁄   ⁝   ⁞
                                                   ⁄   ⁝   ⁞
          [L   M   L]$_{Predicate}$ [L   M   L]$_{Predicate}$

As in spoken languages, the featural affix must be associated with a base (here: with the predicate) in order to be prosodically licensed. Consequently, a negated utterance like the one given in (19a), in which the headshake follows the sentence, is ungrammatical due to a lack of prosodic licensing of the featural affix. In DGS, such structures are only possible when the first part of the sentence is accompanied by a question facial expression (raised eyebrows), as in (19b). In this case, however, we are dealing with a question-answer pair, that is, with two clauses. The question part can be considered a sort of rhetorical question the answer to which is only expressed non-manually in the form of a negative interjection. A similar NZSL example is provided in (19c) (McKee 2006: 84).[14]

                                    ‾‾‾‾hs‾‾‾
(19)   a. *WOMAN FLOWER BUY   [DGS]
           'The woman does not buy a flower.'

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[13] According to Perlmutter (1992), LML constitutes the maximal syllable in sign languages, other possible syllable types being L, ML, LM en M (note that Perlmutter uses P (position) instead of L).

[14] Note that structures like (19a), that is, negated sentences in which the headshake follows the sentence-final manual sign, have been claimed to be grammatical in British Sign Language (Sutton-Spence and Woll 1999) and ASL (Veinberg and Wilbur 1990; Dively 2001) even without non-manual question marking on the first part.

$$\overline{\phantom{\text{INDEX}_1 \text{ CINEMA}_3}\underset{\text{q}}{}\underset{\text{hs}}{}}$$

b. INDEX₁ CINEMA₃ GO-TO₃   [DGS]
   'I don't go to the movies.'
   (or: 'Me going to the movies? No.')

$$\overline{\phantom{\text{WORTH GO}}\underset{\text{rhet-q}}{}\underset{\text{hs}}{}}$$

c. WORTH GO CONFERENCE   [NZSL]
   'Is it worth going to the conference? I don't think so.'

The fact that the featural affix (i.e. the headshake) does not simply attach to the sentence-final sign but rather to the predicate (as is indicated in (18)), becomes clear when we consider sentences that contain the optional manual element NOT. The examples in (20) illustrate that headshake on the manual Neg sign only leads to ungrammaticality.

$$\underset{\text{hs}}{}$$

(20) a. *WOMAN FLOWER BUY **NOT**   [DGS]
       'The woman does not buy a flower.'

$$\underset{\text{hs}}{}$$

b. *POSS₂ HAIRDO NICE **NOT**
   'Your hairdo is not nice.'

In DGS, the predicate must be accompanied by a headshake in negated sentences. As mentioned before, I assume that the headshake on NOT is lexically specified while the headshake on the predicate is the result of featural affixation. Note that, just as in (19), the sentences in (20) would be grammatical if the first part of the sentence was accompanied by non-manual question marking.

The above discussion of the properties of sentential negation in DGS suggests that, from a typological point of view, DGS can be compared to languages such as Ewe and Háusá in that it shows split negation with one Neg element, the manual Neg element NOT, being a particle and the other one, the headshake, an obligatory affix that attaches to the predicate. In contrast to Ewe and Háusá (and Turkish), however, the negative affix is featural in nature and behaves in a way similar to tonal prosodies and other featural affixes in spoken languages.

In conclusion of this section, I want to draw the reader's attention to the results of a recent neurolinguistic study which appear to support an analysis of the negative headshake as a prosodic marker. Atkinson et al. (2004) compared the comprehension of negative sentences by users of British Sign Language (BSL) with left or right hemisphere lesions. They argue that if the headshake ("facial negation" in their terms) was a purely syntactic marker, then its

comprehension should be relatively spared in subjects with unilateral right hemisphere (RH) lesions – just like the comprehension of other aspects of syntax. It turned out, however, that BSL users with RH lesions were specifically impaired in processing non-manual negation. While they had no problem in processing sentences that contained a manual Neg sign, they had clear difficulties in understanding negative sentences that were only non-manually marked. Based on the assumption that prosody is processed in the RH, the authors conclude that non-manual negation in BSL is a prosodic marker. Crucially, RH-lesioned subjects scored within normal limits on a range of other language comprehension tasks.

4.2   *Prosodic alterations in spoken language negation*

In this section, I am going to show that prosodic alterations are also attested in the context of negation in some spoken languages. I will present some intriguing spoken language data, which I take to parallel the DGS examples presented in the previous section in that negative marking – be it by means of simple or split negation – involves a prosodic change.

For the most part, this prosodic change is a change in tone, the language that I wish to discuss first being the only exception. In Banda-Linda, a Niger-Congo language spoken in the Central African Republic, a fairly unusual way of negative formation is observed. In Banda-Linda, the negative particle *ne* occurs in sentence-final position. Moreover, the verb is modified by means of reduplication of its first syllable, as is shown in (21b) and (21d). That is, we are not dealing with a separable negative affix; rather the CV-skeleton of the verb is altered in a predictable way under the influence of a Neg element. This alteration is clearly prosodic in nature (Cloarec-Heiss 1986: 356f).

(21) a. Àndà   ʒú   [Banda-Linda]
          house burn.COMPL
          'A house has burned.'

      b. Àndà   **ʒúʒú**   **nē**
          house burn.COMPL.NEG NEG
          'A house has not burned.'

      c. Cé   gérè
          he   grow.COMPL
          'He grew.'

   d. Cé   gé**gé**rè   **nē**
       he   grow.COMPL.NEG   NEG
       'He did not grow.'

In Twi, a Kwa language spoken in Ghana, sentences are negated by a negative prefix which attaches to the verb. This prefix is a nasal which is homorganic with the following consonant of the verb stem. Interestingly, prefixation is accompanied by a tone change: the tone on the last syllable of the verb stem – *tè* ('speak') in (22b) and *twà* ('cut') in (22d) – is raised (Redden and Owusu 1963: 27f). Note that the tone change cannot be interpreted as the result of tone-spreading, since according to Redden and Owusu (1963: 26), the nasal prefix is low-toned.

(22) a. Yɛ-tè   Twíì   [Twi]
         1.PL-speak   Twi
         'We speak Twi.'

      b. Yɛ-**n**-té   Twíì
         1.PL-NEG-speak   Twi
         'We don't speak Twi.'

      c. Mẽ-twà   bòròdò
         1.SG-cut   bread
         'I cut bread.'

      d. Mẽ-**ñ**-twá   bòròdò
         1.SG-NEG-cut   bread
         'I do not cut bread.'

Patterns of negative marking are somewhat more complex in Gã, a Western Sudanic language spoken in Ghana. In Gã, the realization of negation on the verb crucially depends on the tense specification of the sentence. In the perfect tense, the low-toned negative suffix -*kò* is used and moreover, just as in Twi, a tone change from low to high is observed in the verb stem (23b). Even more intriguing, however, is the past tense pattern. In the past tense, there is no visible negative suffix. It is only the shape of the verbal stem that is modified by lengthening the final vowel and by raising its tone (23d) (Ablorh-Odjidja 1968: 60ff).

(23) a. Mí-yè   níì   mómó   [Gã]
          1.SG.PERF-eat   meal   already
          'I have already eaten my meal.'

      b. Mí-yé-**kò**   nókō
          1.SG.PERF-eat-NEG   something
          'I have not eaten anything.'

      c. Mí-gbè   gbèé kō
          1.SG.PAST-kill dog   ART
          'I killed a dog.'

      d. Mí-gb**ée**   gbèé kō
          1.SG.PAST-kill.NEG   dog   ART
          'I did not kill a dog.'

Obviously, negation is realized by a prosodic/phonological change only in the
Gã past tense; no particle or visible affix is involved. A similar pattern is found
with some verbs in Ógbrû, a Kwa language spoken in the Southern Ivory Coast.
According to Mboua (1999), the negative marker in Ógbrû is a discontinuous
morpheme characterized by a high tone featural affix and the post-verbal
negative particle *mú*, which also bears a high tone and which is subject to vowel
harmony. In (24b), the high tone gets associated with the aspectual morpheme *ò*
that intervenes between the subject and the verb while the particle follows the
verb. Note, however, that the negative particle never appears in sentences with
monosyllabic high-tone verbs. This restriction is the result of a general tonal
constraint which prevents the appearance of three successive high tones.
Consequently, in (24d) – just as in the Gã example (23d) – negation is realized
by a prosodic change only (Mboua 1999: 15f).

(24) a. Kirî   ò   búkù   òkókò   [Ógbrû]
          Kéré   ASP ask.for.RES   banana
          'Kéré has asked for the banana.'

      b. Kirî   **ó**   búkù   **mú**   òkókò
          Kéré   ASP.NEG ask.for.RES   NEG   banana
          'Kéré has not asked for the banana.'

      c. Kirî   à   pá   òkókò
          Kéré   ASP buy.RES   banana
          'Kéré has bought bananas.'

d. Kirî   **á**   pá   òkókò
    Kéré   ASP.NEG buy.RES   banana
    'Kéré has not bought bananas.'

e. *Kirî   **á**   pá   **mú**   òkókò
    Kéré   ASP.NEG buy.RES   NEG   banana
    'Kéré has not bought bananas.'

In contrast to (24d), example (24e) is ungrammatical because it involves a sequence of three high tones: the negative high tone on the aspectual marker, the high tone on the verb, and the high tone on the negative particle.

The above examples exemplify that prosodic modifications – be it by means of reduplication or tone change – are also observed in some spoken languages in the context of negation. From a typological point of view, I take the Gã and Ógbrû examples to be as close to the DGS examples as one can get when comparing languages in different modalities. Remember that the negative particle in DGS is optional. When the particle is used, the DGS examples parallel the Ógbrû example in (24b) in that we observe split negation with one Neg element being a negative particle and the other one being a featural affix that triggers a prosodic change. In the case of particle drop, which is actually very common in DGS, the situation resembles the one in the Gã past tense (23d) and the Ógbrû example (24d) in that negation is realized by a prosodic modification alone.

4.3   Prosodic spreading

So far, the picture appears to be quite clear. Things get somewhat more complicated, however, when we take into account that sentential negation in DGS may also be expressed in a slightly different way. In the DGS examples in (9) and (10) above, the negative headshake was indicated as being associated with the verb or the predicate sign only. It is, however, possible for the headshake to spread onto preceding constituents. In (25a), for instance, the headshake does not only accompany the verb BUY but also the direct object FLOWER. Note that spreading of the headshake is constrained. In particular, it is not possible for the headshake to spread over parts of the verb phrase (VP) only. Consequently, the sentences in (25b) and (25c) are ungrammatical. In both cases, the non-manual spreading targets only part of the respective object NP: the post-nominal adjective RED in (25b) and the noun BROTHER in (25c).

$$\overline{\qquad\qquad}^{\text{hs}}$$

(25) a. WOMAN INDEX$_{3a}$ [FLOWER BUY]$_{VP}$ [DGS]
         'The woman does not buy a flower.'

$$\overline{\qquad\qquad}^{\text{hs}}$$

      b. *WOMAN INDEX$_{3a}$ [FLOWER RED BUY]$_{VP}$
         'The woman doesn't buy a red flower.'

$$\overline{\qquad\qquad}^{\text{hs}}$$

      c. *YESTERDAY INDEX$_1$ [POSS$_2$ BROTHER MEET]$_{VP}$
         'Yesterday I didn't meet your brother.'

$$\overline{\qquad\qquad}^{\text{hs}}$$

      d. INDEX$_{3a}$ [FLOWER BUY]$_{VP}$
         'She does not buy a flower.'

In other words: with transitive verbs such as BUY and MEET, if spreading occurs, it has to target the entire VP. It could therefore be suggested that non-manual spreading is syntactically constrained in that the relevant domain is the VP.[15] Alternatively, one could suggest that the VP constitutes a prosodic domain (a Phonological Phrase) and that non-manual spreading is constrained by prosodic constituency. Clearly, such a proposal would be in line with my suggestion that the headshake constitutes a prosodic modification. Deciding between a syntactic and the prosodic account is not straightforward because more often than not prosodic constituents are isomorphic with syntactic constituents (Nespor and Vogel 1986; Sandler 1999). Note that in DGS, the headshake does not usually spread onto the subject NP, for instance, WOMAN in (25a). From a syntactic point of view, the subject occupies a higher position within a hierarchical phrase structure. From a prosodic point of view, it could be argued that subject NPs are topical and therefore constitute a Phonological Phrase of their own. This assumption is corroborated by the observation that spreading is more common with pronominal subjects (25d). Clearly, pronominal subjects occupy the same

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[15] This is in fact what Neidle et al. (2000) suggest for ASL. They explain the spreading behavior of the headshake in terms of c-command. Remember that word order in ASL is S-(Neg-)V-O. In the absence of the manual Neg sign, the headshake must spread over the entire VP, that is, the c-command domain of Neg (i). In ASL, in contrast to DGS, it is impossible for the headshake to be associated with the predicate only (ii) (Neidle et al. 2000: 44f).

$$\overline{\qquad}^{\text{hs}}$$

   i. JOHN BUY HOUSE   [ASL]
      'John is not buying a house.'

$$\overline{\qquad}^{\text{hs}}$$

   ii. *JOHN BUY HOUSE

syntactic position as lexical subjects but in contrast to lexical subjects, they do not usually constitute a prosodic constituent of their own.

Following the argumentation in Section 4.1, we must assume that in (25a), a prosodic feature associated with the verb has spread onto a neighboring constituent. Since I have claimed that the negative headshake behaves in a way similar to tonal prosodies in tone languages, the question emerges whether prosodic features in spoken languages are also capable of spreading across word boundaries. The answer to this question is definitely positive. In the literature, the relevant phenomenon is usually referred to as external tone sandhi. Below, I will present representative examples from the two Bantu languages Setswana and Tsonga.

For Setswana, a language spoken in South Africa and Botswana, remarkable tone sandhi phenomena are described by Creissels (1998). In (26), I give an example of progressive high tone spreading. By themselves, the Setswana words *bàthò* ('persons') and *bàŋwì* ('certain, some') have no high tone, and no high tone appears when they combine in a phrase as in (26a). In (26b), however, the high tone of the comitative marker *lí-* ('with'), which is prefixed to the noun, spreads rightwards onto three successive syllables. Hence, the noun as well as (part of) the post-nominal modifier are subject to prosodic modification (Creissels 1998: 150). Note that the vowels that undergo tone change are underlined.

(26) a. bàthò bàŋwì   [Setswana]
  persons certain
  'certain persons'

  b. lí-b<u>á</u>th<u>ó</u> b<u>á</u>ŋwì
  with-persons certain
  'with certain persons'

The second example I wish to cite comes from Tsonga, a Bantu language spoken in Mozambique and South Africa. Baumbach (1987) observes various instances in which a high tone preceding a word with only low tones spreads onto all syllables of this word except for the last one (his "Tonological Rule 1"). One particularly interesting case is that of a low-tone object NP following a high tone verb. Two examples are given in (27). Underlyingly, the nouns *xìkòxà* ('old woman') and *nhwànyànà* ('girl') bear only low tones. In the sentences in (27a) and (27b), however, the first two syllables of the object nouns receive high tone due to progressive high tone spreading from the preceding verb (Baumbach 1987: 48).

(27) a. Vá   pfúná   xí̱kó̱xà   [Tsonga]
          they   help   old.woman
          'They help the old woman.'

      b. Ú   rhándzá nhwá̱nyá̱nà
          he   likes   girl
          'He likes the girl.'

The examples in (26) and (27) illustrate that prosodic spreading across word boundaries is in fact attested in spoken languages, too. For instance, high tones may spread rightwards from a high tone prefix throughout a noun and onto the first syllable of the following word (as in Setswana) or rightwards from a verb onto the first two syllables of an adjacent noun (as exemplified by Tsonga).

I therefore claim that optional spreading of the headshake in DGS – as exemplified by (25a) and (25d) – is an instance of prosodic feature sandhi comparable to external tone sandhi in spoken languages. Still, there are important differences between the two phenomena. These differences will be subject to discussion in the next section.

4.4   *Differences between tone and headshake*

It is a well-known fact that spoken language autosegments, that is, elements which are capable of spreading onto larger morphological or prosodic domains, are lexically active. Therefore, in tone languages, it is common to find minimal pairs which are distinguished by tone only; see, for instance, the Dagaare example in (15). This, however, seems not to be the case for the feature [headshake] in DGS, since there are no two signs in DGS which are lexically distinguished only by the presence versus absence of headshake.[16] Hence, in contrast to tone, headshake is not a prosody-changing but a prosody-adding phenomenon.

This difference might be due to the fact that in tone languages every tone-bearing unit must have a certain tone value and, conversely, that every tone must always be associated with some tone-bearing unit. In other words: no vowel can be articulated without a tone. Because of this restriction, spreading of tone requires repeated delinking or change of tone features (Odden 1995). A similar restriction, however, does not hold for the sign language examples under consideration. Just like tones, the prosodic feature [headshake] always has to be

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[16] At first sight, the two DGS signs NOT and ONE-HUNDRED appear to be possible candidates for a minimal pair. ONE-HUNDRED does indeed have the same handshape, orientation, location, and movement as NOT but on closer inspection, it turns out that manner of movement differs from that of NOT in that the movement of ONE-HUNDRED is somewhat shorter and less tense.

associated with a skeletal position (the L- and M-positions in (18)). In contrast to tone languages, however, these positions are for the most part not inherently (lexically) specified for that prosodic feature. Consequently, spreading of the non-manual marker in DGS does not imply a feature change. Rather, a prosodic feature is added to the featural make-up of a sign.

Possibly, a comparison of tone and headshake can better be drawn at the sentence level. As mentioned above, it has been proposed that non-manual markers in sign languages can sometimes fulfill the role of intonational contours in spoken languages. Similarly, in many spoken languages, intonation consists of suprasegmental tonal features which are not lexically active. According to this interpretation, the DGS headshake constitutes a negative intonation contour in very much the same way as a particular sequence of tones in spoken languages may constitute a question intonation.

Irrespective of the exact analysis of the headshake – as a prosodic feature associated with a sign or as an intonational contour – I want to point out a second difference between tone and headshake. Tones can never appear simultaneously; they can only be combined sequentially (for instance, as a falling tone: HL). In contrast to that, non-manual markers in sign languages can very well be articulated simultaneously, since they can be layered (Sandler 1999; Wilbur 2000). Due to this peculiarity, the negative headshake can in principle spread over other non-manual features, such as for instance lowered eyebrows or forward head tilt, without affecting these features or being blocked by them. That is, we do not find opacity effects as, for example, in the Terena example in (17b) where an obstruent blocks spreading of the feature [+nasal]. Only a non-manual feature on the same autosegmental tier (for instance, a headnod) could in principle block the spreading of the headshake.

5   A note on typological variation across sign languages

At the outset of this paper, I have already pointed out that striking similarities have been found across unrelated sign languages when it comes to the expression of sentential negation. In fact, all sign languages studied to date employ manual and non-manual markers. The existence of such a basic common pattern, however, does not imply that all sign languages are typologically the same. Actually, on closer inspection, it turns out that the attested similarities are only superficial ones. In this section, I will provide data from some other sign languages that suggest that the analysis that I offered above for DGS may not be generally applicable to sign languages.

Let us first look at sign languages that seem to pattern with DGS in the expression of negation. In Indopakistani Sign Language (IPSL), just as in DGS, the basic word order is SOV and the manual Neg sign follows the verb. In (28a),

the headshake extends over the manual Neg sign and the verb. The manual negator, however, is optional, as can be seen in (28b), where only the verb is accompanied by a headshake (Zeshan 2000: 114).

$$\overline{\hspace{2cm}\text{hs}\hspace{2cm}}$$
(28) a. DEAF INDEX₃ UNDERSTAND NOT   [IPSL]
          '(Only) the deaf people don't know about it.'

$$\overline{\hspace{1.5cm}\text{hs}\hspace{1cm}}$$
      b. PAKISTAN ORGANIZE   UNDERSTAND
          'The Pakistanis don't know how to organize.'

Similarly, in Catalan Sign Language (*Llengua de Signes Catalana*: LSC), the manual sign is optional and follows the verb. In contrast to DGS, however, it is possible for the headshake to accompany the manual Neg sign only; compare (29a) with the ungrammatical DGS example (20a). In the absence of NOT, LSC patterns with DGS in that the headshake may extend over the verb sign only (29b). Optionally, it may spread over the direct object– just as in DGS (Pfau and Quer 2007: 131).

$$\overline{\hspace{0.8cm}\text{hs}\hspace{0.4cm}}$$
(29) a. SANTI MEAT EAT NOT   [LSC]
          'Santi doesn't eat meat.'

$$\overline{\hspace{0.5cm}\text{hs}\hspace{0.3cm}}$$
      b. SANTI MEAT EAT
          'Santi doesn't eat meat.'

Example (29b) implies that the headshake is a featural affix that attaches to the predicate in the way sketched in (18). The grammaticality of (29a), however, suggests that in LSC, the featural affix may also combine with the manual Neg sign, which presumably is not lexically specified for this non-manual feature. Still, headshake is prosodic in LSC; it is suprasegmental and it is capable of spreading over well-defined domains.

Sign languages which employ an optional manual negative element and an obligatory non-manual marker are referred to as non-manual dominant sign languages by Zeshan (2006a). Sign languages of this type contrast as a group with manual dominant sign languages, in which the use of a manual negator is obligatory. Italian Sign Language (*Lingua Italiana dei Segni*: LIS) is a language of the latter type. Consider the examples in (30). In (30a), just as in (29a), the headshake accompanies only the sentence-final Neg sign. In striking contrast to LSC and DGS, however, in LIS, the manual Neg sign is obligatory. Hence,

(30b) is ungrammatical irrespective of the scope of the non-manual marker (Geraci 2005). Moreover, even in the presence of the manual sign NOT, the headshake cannot spread; it is confined to the manual negative sign.

(30) a.   PAOLO CONTRACT SIGN NON   [LIS]
           'Paolo didn't sign the contract.'

    b. *PAOLO CONTRACT SIGN

These facts clearly indicate that the headshake in LIS has a status different from that in, for instance, DGS and LSC. More specifically, the headshake in LIS is most probably not a featural affix and it is certainly not prosodic in nature. Rather, it seems likely that the negative sign is lexically specified for the headshake. From a typological point of view this means that LIS, in contrast to DGS and LSC, does not exhibit split negation. In LIS, negation is realized by a particle only.

Similar patterns have been described for other manual dominant sign languages such as, for instance, Hong Kong Sign Language (Tang 2006), Turkish Sign Language (Zeshan 2006b), and Jordanian Sign Language (Hendriks 2007). In these sign languages, too, the manual Neg sign is obligatory and it is impossible (or at least very uncommon) for the headshake to spread beyond the manual Neg sign. Clearly, spreading of the non-manual marker is not excluded in principle for manual dominant sign languages. Future research will have to determine whether it is in fact a general property of manual dominant sign languages that the non-manual marker is not prosodic but lexical – in contrast to the non-manual marker found in non-manual dominant sign languages. Such a correlation would imply an interesting typological division: non-manual dominant sign languages exhibit split negation while manual dominant sign languages use a simple negation (particle) strategy for negating a sentence.

So far, as far as the non-manual negation marker is concerned, I have only been concerned with a side-to-side headshake. In conclusion of this section, let me point out that the realization of the non-manual negation marker is also subject to cultural influences. As is well-known, in some regions, in particular, in the Eastern Mediterranean area (e.g., Greece and Turkey) and the Middle East (e.g., Jordan), a single backwards movement of the head is commonly used as a negating gesture by the hearing population. Not surprisingly, this gesture has found its way into the regional sign languages, where it is used as non-manual grammatical marker (usually alongside the negative headshake).

Obviously, the dynamic properties of the backwards head tilt (bht) are different from those of the headshake: while the headshake consists of repeated movements, the head tilt comprises only one single movement.[17] Given the dynamic nature of prosodic features, it seems less likely for the head tilt to spread over a sequence of signs. Clearly, it cannot be synchronized with manual movements in the way the headshake can (see the discussion under example (9)). In fact, in Turkish Sign Language (*Türk İşaret Dili*: TİD), the head tilt, which accompanies the Neg sign, is not capable of spreading (31a) (Zeshan 2006b: 150). In other words: just as the LIS headshake, this non-manual marker appears not to be prosodic. In Greek Sign Language (GSL), too, a backward head tilt is commonly used in the context of negation. In (31b), as in (31a), the head tilt only extends over the sentence-final negative sign (Antzakas 2006: 265).

```
                              bht
(31)  a.  INDEX₁ TURKEY BORN  NOT                          [TİD]
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(31) a. INDEX_1 TURKEY BORN $\underline{\text{NOT}}^{\text{bht}}$ [TİD]
          'I was not born in Turkey.'

b. PAST $_1\text{TELL}_3$ WORK GO $\underline{\text{NOT}}^{\text{bht}}$ [GSL]
          'I told him not to go to work.'

c. $\underline{\text{INDEX}_1 \text{ AGAIN GO WANT}^{\wedge}\text{NOT}}^{\text{bht}}$ [GSL]
          'I don't want to go (there) again.'

Still, GSL differs from TİD in at least two respects. First of all, in GSL, the backward head tilt is capable of spreading. In (31c), the head tilt extends over the whole sentence (Antzakas 2006: 265). The fact that the head tilt is capable of spreading (although this may be rare) suggests that it is a prosodic marker – just like the headshake in DGS. Secondly, in contrast to TİD, GSL is not a manual dominant sign language. As shown by Antzakas (2006), sentences can be negated by a headshake or a head tilt only. These patterns seem to confirm the typological division suggested above: GSL is a non-manual dominant sign language that has split negation while TİD is a manual dominant sign language that has simple negation.

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[17] In addition, for some sign languages, a head turn, that is, a single sideward movement of the head, has been described as a non-manual negation marker. This marker is usually seen as a reduced form of the headshake (see Antzakas (2006) for Greek Sign Language and Hendriks (2007) for Jordanian Sign Language).

6   Conclusion

In this article, I have investigated in how far the patterns of sentential negation in German Sign Language can be captured within a typological scheme that has been proposed for spoken language negation. By comparing DGS data to selected data from various spoken languages, I have shown that DGS – although it is expressed in the visual-gestural modality – fits well into the typology developed for spoken languages, that is, languages in the vocal-auditory modality. I therefore take the typological scheme to be modality-independent.

First of all, DGS has split negation. One Neg element is an optional, sentence-final particle, the other one is an affix that attaches to the predicate. Secondly, in contrast to what we observe in languages such as Turkish and Ewe, the affix does not have segmental content but rather is featural in nature. The relevant feature is the feature [headshake], which – in order to be prosodically licensed – must be associated with a manual base. I have argued that this featural affix triggers a prosodic change comparable to a tone change in tone languages. Interestingly, similar negation patterns, that is, the combination of a negative particle with a featural affix, are observed in spoken languages such as Gã and Ógbrû. Thirdly, I have shown that negative headshake is capable of spreading. I have suggested to analyze this spreading process as a sandhi phenomenon comparable to external tone sandhi in tone languages. Finally, I have compared the DGS pattern to negation patterns described for other sign languages. Despite some striking similarities – in particular, the combination of a manual and non-manual element – I have argued that sign languages, just like spoken languages, show typological variation in the expression of sentential negation.

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