Conditional clauses in Sign Language of the Netherlands: A corpus-based study

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Conditional clauses are under-researched in sign languages and the research that has been done has mostly employed elicited data. The current study provides a thorough description of conditional clauses in Sign Language of the Netherlands (NGT) based on naturalistic corpus data. Similar to conditionals in other sign languages, conditionals in NGT can be introduced with a manual marker, although it is also possible to only use nonmanual markers such as raised eyebrows, head movement and head tilt. Different, however, is the striking amount of variation that we found – both with respect to manual and non-manual marking. This might be due to differing methodologies, but several other potential explanations are discussed as well. We further provide evidence that nonmanual markers are less frequent in conditionals with manual marker than without manual marker. In addition, we offer an – albeit brief – description of peripheral conditionals in NGT, a conditional type that has not been investigated thoroughly for any sign language yet.

Keywords: conditionals, Sign Language of the Netherlands, corpus study, nonmanuals, variation

1. Introduction

The study of conditional clauses is both intriguing and challenging, as this clause type can be investigated from various perspectives – within the realm of linguistics from a syntactic and semantic perspective, and beyond linguistics also from the perspective of

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logic and philosophy. In its classical form, the conditional sentence type is often formalized as the simple logical formula '*if p, q*'. Linguists generally do not only take the conditional relationship between the antecedent (*p*) and the consequent (*q*) into account; the linguistic form of the conditional expression is also studied. A classic example of a conditional clause is shown in (1):

(1) If Kristina studies hard, she will pass the test.

This prototypical example exhibits two linguistic patterns relevant for conditionals: first, there is a conjunction '*if*' that shows the conditional relationship between the first clause (the antecedent or protasis) and the second clause (the consequent or apodosis). Second, the clause order is such that the (subordinate) conditional clause precedes the main clause. Cross-linguistically, both patterns are very frequent, although variation has been attested as well (Comrie 1986) (see Section 2).

In sign languages (SLs), conditional clauses are seriously under-researched. Moreover, for the few SLs that have been studied, often only the prototypical form is described. Still, the available descriptions can give us important insights into cross-modal patterns. Concerning clause order, for instance, SLs show remarkable similarities to one another and to spoken languages: there is a strong tendency for the conditional clause to precede the main clause. Furthermore, various overt markers for conditionals in SLs have been attested, not only in the form of manual conjunctions, but particularly in the use of nonmanual signals. For example, for each sign language studied so far, claims have been made that conditional clauses are accompanied by raised eyebrows (e.g. Liddell (1986) on American Sign Language, Sutton-Spence & Woll (1999) on British Sign Language, Dachkovsky (2008) on Israeli Sign Language). Crucially, however, most (if not all) of these studies are based on elicited data. The current study – based entirely on naturalistic corpus data – shows that more variation is found in conditionals in Sign Language of the Netherlands (*Nederlandse Gebarentaal* – NGT) than has previously been observed for other SLs. Furthermore, we add to the picture another semantic type, namely peripheral conditionals (Haegeman 1984), which, to date, has never been investigated for SLs.

In the next section, previous studies on conditional clauses (CCs) in spoken and SLs are addressed, with specific attention to three semantic types – neutral, counter-

factual and peripheral CCs – and their syntactic forms. In Section 3, the methodology is described and Section 4 presents the results, which are discussed in Section 5, specifically focusing on variation and typology. Section 6 concludes the paper.

2. Conditional clauses cross-linguistically

To capture similarities and differences between languages, it is interesting to compare patterns cross-linguistically and especially, in the context of SLs, cross-modally. In this section, we provide an overview of common semantic types of conditional clauses (Section 2.1) and their syntactic characteristics (Section 2.2) based on data from spoken and sign languages.

2.1 Semantic types

2.1.1 Neutral and counterfactual CCs

An important distinction is made between neutral and counterfactual CCs (Dancygier 1998). The difference between these two types pertains to the speakers' attitude towards the fulfillment of the antecedent and, when talking about the past, also with knowledge on the consequent. Consider example (1) (repeated here):

(1) If Kristina studies hard, she will pass the test.

The conditional in (1) is of the neutral category (also called factual or open (Dancygier 1998)). Several assumptions can be straightforwardly associated with this construction. First of all, the speaker believes that Kristina will pass the test on the condition that she studies hard, and, due to conversational implicatures (Comrie 1986), the speaker implies that Kristina will not pass the test if she does not study hard. In addition, the CC is formulated such that it seems that the speaker has no knowledge of the actual situation; it could be that Kristina studies hard, but it could also be the case that she does not. In other words, the speaker's attitude towards the antecedent is neutral. Now compare this state of affairs to the example below:

(2) If Kristina had studied hard, she would have passed the test.

In (2), the speaker already knows that Kristina did not pass the test; moreover, s/he believes the outcome would have been different under other conditions. This type of CC is therefore called counterfactual, since it specifies a condition that the speaker believes or knows is not true (Dancygier 1998).

With respect to SLs, the distinction between neutral and counterfactual CCs has been investigated for Israeli Sign Language (ISL, Dachkovsky 2008), and for Russian Sign Language (RSL, Burkova & Kimmelman 2017). In ISL, neutral and counterfactual CCs are claimed to be distinguished by different nonmanual markers accompanying the antecedent. The former are marked with a brow raise, a forward and downward head movement and, often, widened eyes, while the latter are accompanied by a squint rather than widened eyes, as illustrated in (3). The counterfactual CC in (3a) is marked by raised eyebrows and squinted eyes, whereas the neutral CC in (3b) is only marked by raised eyebrows.

(3) a. ISL (Dachkovsky 2008: 74)[2]

br + es

IF HE STOP SMOKE / HE LIVE

'If he had quit smoking, he would be alive.'

b. ISL (Meir & Sandler 2008: 165)

br

TEACHER SICK / LECTURE CANCEL

'If the teacher is sick, the lecture will be cancelled.'

For both sentence types, the use of the manual conditional marker IF is optional. This means that the distinction between neutral and counterfactual CCs is purely based on nonmanual signals. For RSL, Burkova & Kimmelman (2017) describe that squinted eyes are not a dedicated marker of counterfactuality, as they occur in both neutral and counterfactual CCs. Instead, counterfactuality is marked by the manual sign B-Y, originating from a counterfactual modal particle in Russian:

[2] Conventions: see Appendix 1. Examples (3), (8), (9), (11), (12), and (13) are slightly adapted from the original to fit these conventions.

(4) *RSL (Burkova & Kimmelman 2017: 35)*[3]

DOCTOR COME EARLIER / B-Y IX CURE-1 MAY

'If I had asked the doctor earlier, the disease could have been cured.'

2.1.2 Peripheral conditionals

Peripheral CCs (Haegeman 1984), sometimes also referred to as 'biscuit conditionals', is distinct from the CCs introduced in the previous section in that the antecedent is not a condition for the consequent to happen, but rather a *motivation* for expressing the consequent. This important difference is illustrated by the examples in (5).

(5) a. If you're hungry, there's food in the fridge. (Haegeman 1984: 486)

b. If you're right, Chris is probably delayed.

Obviously, whether or not there is food in the fridge, and whether or not Chris is delayed, is not dependent on whether the interlocutor is hungry or right, respectively. However, the conditionals in (5) motivate the expression of the information in the main clauses. Note that the peripherals formally resemble regular conditionals, although in some languages, including English, certain restrictions exist for peripherals. For example, whereas regular English conditionals can include an overt marker of the main clause such as *then*, some speakers experience difficulty with structures like (6):

(6) ?If you're hungry, then there's food in the fridge.[4]

To the best of our knowledge, peripherals have never been described thoroughly for any SL. The one study that mentions them is Burkova & Kimmelman (2017) for RSL[5]; the researchers here show that the main clause in a peripheral CC can be accompanied by certain nonmanuals, such as frowned brows and a head tilt to the side. It is therefore

[3] The nonmanual signals are omitted in most examples in Burkova & Kimmelman (2017).

[4] The same speakers tend to have no difficulties with *then* in sentences like (5b). This is probably due to a difference in character, as (5b) is of a meta-linguistic kind, while (5a) is not. Based on intuitions of several speakers of Dutch and English, we suggest that meta-linguistic peripherals in these languages tend to accept markers as *then*, whereas other peripherals such as (5a) might not.

[5] Burkova & Kimmelman use the term "non-prototypical conditionals" to refer to peripherals.

interesting to investigate whether peripherals are attested in NGT, and if so, whether they are characterized by specific manual or nonmanual features.

2.2 Syntactic characteristics

2.2.1 Clause order

The examples provided so far – both spoken and signed – share one syntactic characteristic: the antecedent precedes the consequent. Although this order is indeed the most frequent one cross-linguistically (Comrie 1986), it is also subject to considerable typological variation. Moreover, many languages allow for both orders; compare, for instance, example (1), repeated here as (7a), with example (7b). Note that in English, reversibility also applies to counterfactual and peripheral CCs.

(7) a. If Kristina studies hard, she will pass the test.
b. Kristina will pass the test, if she studies hard.

Interestingly, for the SLs studied so far, only the order in which the antecedent precedes the main clause is described: this order was found in ISL (Dachkovsky 2008), RSL (Burkova & Kimmelman 2017), NGT (de Haan 2015), American Sign Language (ASL, Liddell 1986), British Sign Language (BSL, Sutton-Spence & Woll 1999), Australian Sign Language (Auslan, Johnston & Schembri 2007), Turkish Sign Language (TİD, Dikyuva, Makarağlu & Arik 2017), Indopakistani Sign Language (IPSL, Zeshan 2000), German Sign Language, and Brazilian Sign Language (DGS & Libras, Paulus 2016). No examples of the reversed clause order were found in the literature. The order of antecedent followed by consequent is shown in (3) above for ISL, and in (8) for BSL:

(8) *BSL (Sutton-Spence & Woll 1999: 89)*
br
IF WANT SWEETS / SIT
'If you want sweets, sit down.'

In (8), the conditional clause (IF WANT SWEETS) precedes the main clause (SIT). The CC is introduced by the sign IF and accompanied by raised eyebrows – both overt markers, which we will address in more detail in the next section.

2.2.2 Expressing a conditional meaning: conjunctions and other strategies

Conditional clauses are sometimes called 'if-clauses', for the simple reason that they are generally introduced by the conjunction *if* in English. The main clause (or consequent) can be marked overtly as well, for instance, by means of the word *then* in English. A spoken language with several options is Mandarin Chinese, in which it is possible to mark both the antecedent and consequent (9a), mark only the consequent (9b), or mark neither (9c):

(9) a. Mandarin Chinese (Li & Thompson 1981)[6]

	rúguǒ	yǒu	cǎihóng	chūxiàn,				
	if	exist	rainbow	appear				
		wǒmen	jiu	zhào	xia	lai		
		we	then	photograph	descend	come		*(p. 648)*

'If a rainbow appears, let's take a picture of it.'

b.	nǐ	bu	lái	tā	jiu	shāng	xīn	ou	
	you	not	come	3SG	then	wound	heart	FW	*(p. 312)*

'Let me tell you, if you don't come, s/he'll be hurt.'

c.	bàba	qù,	wǒ	gēn	tā	qù	
	father	go	I	with	3SG	go	*(p. 633)*

'If father goes, I'll go with him.'

In example (9a), the overt marker *rúguǒ* (*if*) introduces the conditional clause. In (9b) this marker is not present, but *jiu* (*then*) marks the consequent clause. In (9c), no overt marker is used; instead, the fact that the two clauses appear together show the speaker's intention of expressing a conditional meaning (Li & Thompson 1981: 633). According to Comrie (1986), most languages mark either the antecedent, or the consequent, or both. He further notes that the first option (overtly marking the

[6] FW stands for 'friendly warning'.

antecedent) is the most common one cross-linguistically. A common strategy for marking the antecedent is the use of a conjunction like *if*; however, there are other syntactic strategies as well. In Dutch, for instance, CCs are usually introduced by the conjunction *als* (*if*), but alternatively, a conditional can be expressed without this conjunction, either in the form of an imperative (10a), or by a structure with subject-verb inversion that resembles a polar interrogative (10b)[7]:

(10)a.	Koop	een	ticket	en	win	leuke	prijzen!		(Dutch)
	Buy	a	ticket	and	win	nice	prizes		
	'Buy a ticket and win nice prizes!'								
b.	Blijft	hij	dit	doen,	dan	gaat	het	mis	(Dutch)
	Keeps	he	this	doing,	then	goes	it	wrong	
	'If he keeps on doing this, it will go wrong.'								

One could argue that the structure in (10b) originates from a rhetorical question-answer pair, since '*Blijft hij dit doen?*' is a well-formed polar question in Dutch (whereas a typical conditional such as '*Als hij dit blijft doen*' is not). What is interesting cross-linguistically, is that the similarity between polar interrogatives and conditionals occurs more often, and that it is not only reflected syntactically, but also morphologically. For example, the marker *-ve* in Hua can indicate an interrogative as well as a conditional (Haiman 1978):

(11) *Hua (Haiman 1978: 570)*[8]

E-si-ve	baugu-e
come-3SG.FUT-INT	will.stay-1SG

'Will he come? I will stay.'

or: 'If he will come, I will stay.'

[7] These options are different from (9c), since the antecedent in (9c) would translate to 'Father is going' (Li & Thompson 1981: 633), i.e. a regular declarative sentence.

[8] INT stands for interrogative.

Thus, we can conclude that spoken languages show remarkably varying options for expressing a conditional meaning, although some are more frequent than others, and that in some languages, there are formal similarities between CCs and interrogatives.

Turning to sign languages, it is known that there are several options as well. For example, most studied SLs show CCs with an overt manual conjunction, but it is optional. When the conjunction is present, it always appears clause-initially, aligning well with cross-linguistic patterns. However, in all SLs, CCs can also be marked only nonmanually. It is furthermore intriguing that one of the nonmanual markers is the same for all described SLs; namely, raised eyebrows (shown in examples (3) and (8) above). This patterns with the similarities between conditionals and polar interrogatives we described above (see the constructions from Dutch (10b) and Hua (11)), since raised eyebrows are also a marker for polar interrogatives in SLs (e.g. described by Coerts 1992 for NGT; Baker & Cokely 1980 for ASL; Meir & Sandler 2008 for ISL).

For many SLs, scholars also mention some kind of head movement. In ASL, for instance, a head thrust, "a single outward and downward movement of the head" (Liddell 1986: 252), consistently accompanies the final sign of the CC. An example is given in (12):

(12) ASL (Liddell 1986: 252)

hth

br + rot-r

BORN GIRL / NAME S-U-N-N-Y

'If it's a girl her name will be Sunny.'

Other frequently described signals that are articulated by the head are a head nod and head tilt. The examples in (13) show conditionals in Auslan with a backward head tilt:

(13) a. Auslan (Johnston & Schembri 2007: 214)

br+htb

HOT TOMORROW / PRO$_1$ GO.TO BEACH

'If it is hot tomorrow, I will go to the beach.'

b. br+htb bf

I-F WIN L-O-T-T-O / WHAT D-O PRO2

'If you won Lotto, what would you do?'

Note that the main clause fulfills different functions in (13a) and (13b): whereas the main clause in (13a) is a regular statement, (13b) shows a question. The accompanying nonmanuals show specific question marking in the latter case. Also note that (13a) does not include a conjunction, whereas (13b) uses the fingerspelled I-F (Johnston & Schembri 2007).

Other possibly relevant signals, although mentioned less frequently, are widened eyes (e.g. Zeshan (2000) for IPSL; Dachkovsky (2008) for neutral CCs in ISL) and a body lean (e.g. de Haan (2015) for NGT). Because all signals mentioned thus far are expressed by different articulators, it is not entirely clear whether they are all individual markers or that a combination of signals expresses the conditional meaning. By providing a thorough description of conditionals in NGT, we hope to shed new light on this issue. The following section describes the methodology of the current study.

3. Methodology

3.1 The corpus NGT

The data are extracted from the Corpus NGT (Crasborn, Zwitserlood & Ros 2008). This corpus, in which 92 native signers participated, currently consists of 2375 videos, of which about 16% is annotated for manual signs and about 8.5% for translations (and about 7% for both). Signers were filmed in pairs and were requested to perform multiple language-related tasks: introducing themselves, discussing some issues regarding sign language and deaf culture, telling about remarkable events in their life, playing a game of 'spot the difference', and telling stories based on fables, comics, tv sketches and picture books. For more information about the participants, see Section 3.2.

It is important to note that searching the corpus is only possible for the clips with annotation; i.e. 380 videos. To include as many CCs as possible, and to find CCs with

manual marker as well as without, we used two methods of data collection, which both will be described in the next section.

3.2 Participants

The 92 signers in the corpus NGT come from all regions in the Netherlands, although most of them are from the Groningen, Amsterdam or Voorburg region. This is relevant because there is regional lexical variation in NGT (Schermer & Harder 1986; Schermer 2004), originating from the different deaf schools around the country in the 20th century: one deaf school was located in the North (Groningen), one in the South (Sint Michielsgestel), and three in the West of the Netherlands (Amsterdam, Voorburg, Rotterdam). This lexical variation should be kept in mind when doing research with signers from different regions.

Of the 92 signers featured in the corpus, 58 participate in the clips included in our dataset. Their ages vary from 17 to 84 years. Their regional distribution is shown in Figure 1. To be more precise: 26 signers came from Groningen, 11 from Amsterdam, 9 from various regions, 7 from Voorburg, 1 from Sint Michielsgestel, and 4 came from other regions. Half of the signers are female.

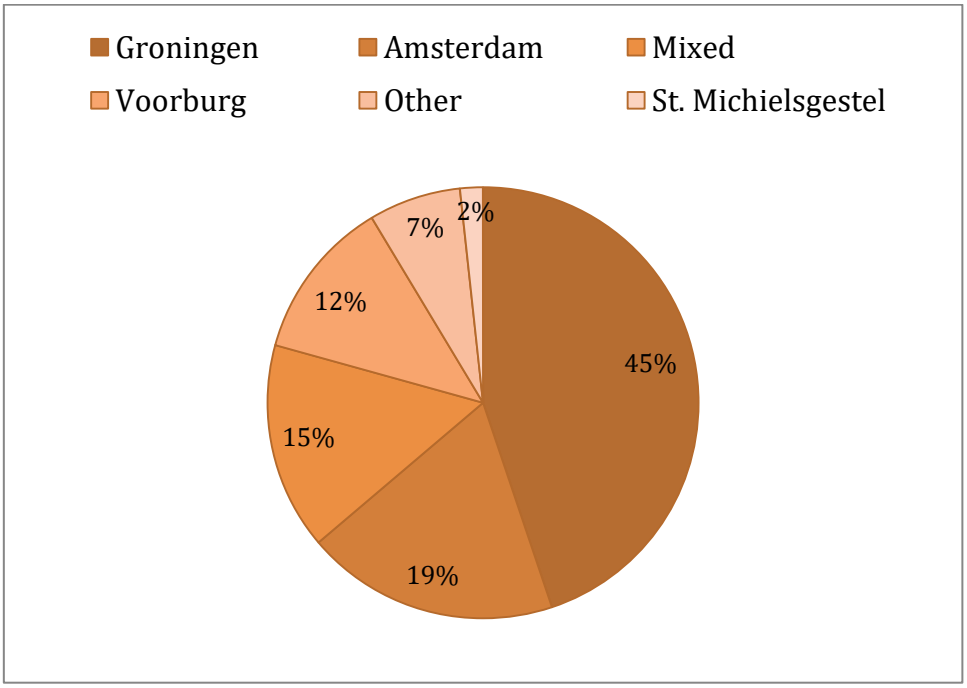

Figure 1. Distribution (in percentages) of regions of the signers in the analyzed clips.

3.3 Analysis and annotation

3.3.1 CCs with a manual marker

The first part of this study focused on manual marking of CCs and therefore, the first step was to search for the Dutch sign glosses ALS ('if')[9] and STEL ('suppose') with the use of ELAN[10] software (Crasborn & Sloetjes 2008). The results were saved in an Excel-file in which the sentences were analyzed. Since the sign ALS has several meanings (it is, for instance, also used in comparative constructions), a first crucial step was to identify the conditional clauses. The main criterion for identification was the semantic content of the clauses.

After the elimination of non-conditional uses, we observed that seven different glosses (ALS-a to ALS-d and STEL-a to STEL-c) were used to refer to at least this many signs with a conditional meaning; but not all glosses were used consistently. Therefore, the second step was to categorize the signs by making annotations based on phonological characteristics of the signs. This was done manually for all CCs. A sign was categorized as a distinct sign when it occurred at least five times and was used by at least three different signers. When a sign did not meet these criteria, it was categorized as 'other'. The following aspects were also noted: the order of the CC vis-a-vis the main clause, the mouthing accompanying the conjunction, whether the main clause was introduced by the sign DAN ('then'), and a first impression of the nonmanuals. In a third step, we reorganized the CCs per sign and described for *every fifth* sentence whether the following nonmanual features were present: raised or furrowed eyebrows, eye gaze, squinted or widened eyes, head tilt, head movement and nod, and body lean. Both the CC itself and the transition between CC and main clause were analyzed. This procedure resulted in the identification of 357 manually marked conditional clauses, of which 71 were analyzed for nonmanual markers.

[9] In the examples presented in the following sections, the English glosses IF and SUPPOSE will be used, together with a number that represents the variant (see Section 4.1 and Table 1).
[10] http://tla.mpi.nl/tools/tla-tools/elan, Max Planck Institute for Psycholinguistics, The Language Archive, Nijmegen, the Netherlands.

3.3.2 CCs without a manual marker

Obviously, CCs that are only marked nonmanually cannot be found by searching for a conjunction on the gloss tier. The second part of the data collection therefore consisted of finding and analyzing CCs without manual marker. This was done in two ways: i. by collecting all CCs without manual marker that were encountered coincidentally (while analyzing the ones *with* manual marker and looking at the context); ii. by searching for the Dutch conjunction *als* (*if*) on the translation tier in the Corpus NGT in order to find instances that were translated as CCs and checking whether the signed string would indeed qualify as a CC. The non-conditional uses of *als* were excluded, the results were again saved in an Excel-file, and the CCs were analyzed for the presence/absence and scope of the aforementioned nonmanuals. The elimination of non-conditionals turned out to be challenging in some cases, for reasons that will be explained in the next section. Eventually, 50 CCs without a manual marker were analyzed.

3.3.3 Methodological challenges

There were three particular challenges that we would like to point out. The first one concerns distinguishing CCs from temporal clauses. In NGT, as in Dutch, ALS can be used both for CCs and for some temporal clauses. An example is shown in (14):

(14) *C0766, S38, 03:47.760*[11]

IF-4 IX_3 CHILD BIG #W IX_3 / INDEPENDENT IX_3

'When a child grows older, it is independent.'

Sentences of this type are clearly temporal, since the signer does not doubt whether the child will grow up or not. Other cases, however, are less clear and cannot be classified without context. We adopted a conservative strategy: if the context did not provide enough information to allow for an unambiguous classification, the sentence was not included in our data set.

The second challenge concerns the identification of CCs without a manual marker; we would like to highlight two difficulties in this matter. The first one concerns cases of CCs that are semantically typical, but still do not seem to be marked at all. The

[11] #W refers to the fingerspelled W with which the signer refers to the Dutch word *wordt*, which means 'becomes'.

challenge here is that we made an effort not to be led by nonmanual signals too much, since these were exactly the elements we were interested in. In other words, it could give a biased view of CCs in NGT if we focused only on sentences with prototypical nonmanuals (e.g. raised eyebrows). Instead, the semantics of the clauses were leading in coming to a decision. An example of a CC that is neither manually nor nonmanually marked is provided in (15):

(15) C0064, S06, 00:16.400[12]

DEAF GROUP SOMETHING ORGANIZE PALM.UP / IX_1 RATHER IX_3 PALM.UP /

CAN MYSELF ARRANGE GROUP $GO_{3\text{-CL:GROUP}}$

'[If] a group of deaf people organizes something and I would rather go somewhere else, I can arrange a group myself to go there [somewhere else].'

The context of (15) clearly shows that we are dealing with a conditional meaning. It is, therefore, included in our dataset. However, the clause is zero-marked, and some uncertainty therefore remains.

Another difficulty in identifying CCs without a manual marker is encountered in cases where nonmanual marking could be interpreted as either conditional or topical. In many languages, spoken and signed, topics and CCs look very similar (Haiman 1978; Janzen 1999), and this is also true for NGT. Kimmelman (2014) found that topics in NGT can be left unmarked – example (15) shows this to be possible for CCs in NGT as well – and that shifted topics in particular are marked by raised eyebrows and a head tilt. Remember that these are also the nonmanuals that have been described for CCs in other SLs. The difficulty in distinguishing CCs from topics is illustrated by the following example:

[12] The signer repeats herself a few times in this sentence. For the sake of clarity, the repetition is left out.

(16) C0005, S03, 03:22.320

htf hmf hs

br

IX$_1$ SEE DEAF / HANDICAPPED PALM.UP

'Looking at deaf people, I don't consider them handicapped.'

or: 'If I see a deaf person, I don't consider him/her handicapped.'

The signed sentence in (16) seems to allow for two translations; the first translation includes a topic, and the second translation includes a conditional clause. It was not immediately clear which interpretation was correct, and the nonmanuals and prosody were not conclusive either. Eventually, when considering the larger context, it became clear that the signer had already mentioned a few times that she did not see deaf people as handicapped, using topic constructions. Therefore, we considered the topic interpretation more appropriate, and the example was left out of our dataset.

The last challenge we would like to address lies in finding clear examples of non-factual CCs without the necessary background knowledge on the situation. One of the topics discussed by the pairs in the corpus concerned having deaf children, leading to a very frequent conditional which could be interpreted in multiple ways, e.g. 'If I had a deaf baby / If my baby had been deaf'. In most cases, it is known to neither the annotator of the corpus nor to the author whether the participants have had a deaf baby or not, i.e. whether or not this conditional should be interpreted as neutral or counterfactual.[13] In fact, we found very few instances of clearly non-factual CCs. Therefore, the distinction between neutral and counterfactual CCs was not made in the analysis.

4. Results

In total, 407 conditional clauses were analyzed: 357 CCs with and 50 CCs without manual marker. A first clear pattern that emerges from the data is the position of the conditional vis-à-vis the main clause: in line with what has been described for other SLs,

[13] Note that tense is not marked on the verb in many (studied) sign languages.

the CC precedes the main clause. Furthermore, CCs are often introduced by a manual conjunction, but this is not obligatory. An example of a CC without manual marker is the following:

(17) C0539, S26, 04:12.475

htf

br

MUCH SAME USE IX_3 / MUST $_3$INCORPORATE$_1$

'[If] it is used much, it must be incorporated.'

In Section 4.1, we take a closer look at the distribution of the CCs with respect to the manual marker used. The nonmanual signals are addressed in Section 4.2. Section 4.3 describes the category of peripheral CCs in NGT, which deserve specific attention as we found nine instances of them and they have not been described extensively for other SLs before.

4.1 Manual marking

We found seven different signs that function as a manual conditional marker. In addition, four other signs were used fewer than five times and by fewer than three different signers, and were therefore categorized as 'other'. The signs have a fixed position within the CC, that is, they always occupy the clause-initial position. In the glosses of the Corpus NGT, a distinction was made between ALS (glossed in the following as IF) and STEL (glossed in the following as SUPPOSE[14]). It is likely that this distinction was made based on the mouthings (*als* 'if' vs. *stel* 'suppose')[15] and place of articulation of the signs (nose and neutral space vs. chin); here, we keep this distinction for the sake of comparison. Table 1 presents an overview of the frequency of these signs and specifications of the signers who use them:

[14] SUPPOSE is glossed as WHAT-IF by de Haan (2015).
[15] However, as we will see later, not all SUPPOSE signs were accompanied by the mouthing *stel* (*suppose*).

Table 1. Manual conditional markers and specifications of the signers that use them.

Sign	Frequency[16]	Number of signers	Region signers	Age signers
IF-1	85	23	18 from Groningen	18-82
IF-2	31	18	Various regions	18-84
IF-3	15	5	Groningen	18-41
IF-4	14	3	Groningen	61-68
IF-5	6	4	Groningen & Amsterdam	24-62
SUPPOSE-1	184	30	Various regions	17-59
SUPPOSE-2	28	16	Various regions	17-62
Other	9	5	Various regions	22-61
No manual marker	50	23	Various regions	17-81

4.1.1 Conjunction IF

The signs IF-1, IF-2, IF-3, IF-4 and IF-5 are shown in Figure 2. Both IF-1 and IF-2 involve a handshape with extended index finger; in IF-1 the index finger touches the ipsilateral side of the nose, while IF-2 is signed in the upper part of the neutral space. IF-3 uses a curved index finger that moves down the bridge of the nose. IF-4 and IF-5 both involve a change in handshape. IF-4 starts with the E-handshape; during the small downward movement in front of the nose, the thumb closes, and the handshape changes to the one depicted in Figure 2d (3). Figure 2e shows the open and closed handshape (I) of IF-5, also signed in front of the nose. All five signs are accompanied by the mouthing *als*.

[16] Note that these frequencies add up to 422 because fifteen sentences involved a combination of two manual markers (see §4.1.3).

(a) IF-*1* *(b)* IF-*2* *(c)* IF-*3*

(d) IF-*4* *(e)* IF-*5*

Figure 2. The NGT conditional conjunctions IF-1 to IF-5.

An example of a conditional in which the sign IF-1 is used is the following:

(18) *C0388, S20, 03:01.840*

hmf hn

bf

es

IF-1 GOOD ARGUMENTATION / PALM.UP

'If there's good argumentation, indeed.'

4.1.2 Conjunction SUPPOSE

The two conjunctions glossed as SUPPOSE-1 and SUPPOSE-2 share the place of articulation, the chin. Figure 3a shows SUPPOSE-1, the most frequent manual marker for CCs in our

dataset. This sign uses a W-handshape that contacts the chin. SUPPOSE-2 (shown in Figure 3b) also contacts the chin but involves an extended index finger. We categorized this as a separate sign, although we noted that in 21 out of 28 cases, the handshape could have assimilated with the sign preceding or following the sign at stake. It is thus possible that SUPPOSE-1 and SUPPOSE-2 are allomorphs of the same sign (see also Section 5.1.3).

(a) SUPPOSE-1 *(b) SUPPOSE-2*

Figure 3. The NGT conditional conjunctions SUPPOSE-1 and SUPPOSE-2.

In example (19), SUPPOSE-1 fulfills the role of conjunction:

(19) C0058, signer 5, 01:08.760

hn

br

SUPPOSE-1 CHILD UNDERSTAND / PALM.UP OTHER.WAY

'If the child understands it, it can go the other way.'

Concerning the mouth actions accompanying SUPPOSE-1 and SUPPOSE-2, we found some interesting distributions, which will be discussed in the next section.

4.1.3 Mouth actions of conditional markers

When we look not only at the signs but also take into account the accompanying mouth actions (Crasborn et al. 2008), a few interesting patterns emerge. Firstly, all the IF-markers are generally signed together with the Dutch mouthing *als* (*if*). For the SUPPOSE signs, however, the mouth actions are not so clear-cut. Both SUPPOSE-1 and SUPPOSE-2 can occur with a mouthing, a mouth gesture or with the mouth in neutral position. Regarding mouthing, we found both *als* and *stel*; for the mouth gestures we differentiated between '*fff*' and 'other', since '*fff*' is the mouth gesture described for SUPPOSE-1 by the Dutch Sign Centre.[17] In Table 2, the distribution of mouth actions for both signs is shown.

Table 2. Distribution of mouthings for the signs SUPPOSE-1 and SUPPOSE-2.

Sign	Mouth action[18]	Type of action	Number	Percentages
SUPPOSE-1	*stel*	Mouthing	75	41
	als	Mouthing	40	22
	unintelligible	Mouthing	8	4
	fff	Mouth gesture	34	18
	other	Mouth gesture	27	15
SUPPOSE-2	*stel*	Mouthing	8	29
	als	Mouthing	11	39
	unintelligible	Mouthing	1	4
	fff	Mouth gesture	1	4
	other	Mouth gesture	7	25

Bank et al. (2011) conducted an elaborate study on twenty lexical signs in NGT and their mouth actions. They consider the most frequent spoken lexical items that accompany a sign as the standard mouthing, which would be *stel* for SUPPOSE-1, but *als* for SUPPOSE-2. On the one hand, *als* being the standard mouthing of SUPPOSE-2 could favor glossing it as an IF-sign. On the other hand, since the IF-markers all occur with one mouthing and the SUPPOSE markers with several, including mouth gestures, it is likely

[17] www.gebarencentrum.nl, online dictionary, entry: STELLEN / STEL-JE-VOOR
[18] The category 'other' includes a neutral position of the mouth, since in some cases the difference between a small mouth gesture and a neutral mouth is hardly discernible.

that we are nonetheless dealing with two different groups of signs: signs for IF and signs for SUPPOSE. The fact that SUPPOSE-1 and SUPPOSE-2 share the same place of articulation, namely the chin, and that none of the IF-markers are articulated on this location, also favors this distinction.

A final particularly fascinating observation is that we found CCs with mouthing of a conjunction but without manual component. In other words, the mouthing (e.g. *als* or *stel*) occurred on its own. Since this is not a manual marker, this will be addressed in the section on nonmanual markers (§4.2.4).

4.1.4 Double manual marking

Interestingly, in fifteen sentences from our data set two manual markers were combined within the CC. In all of these cases, first one of the variants of IF was used, followed by one of the variants of SUPPOSE, mostly involving the signs IF-1 and SUPPOSE-1, but combinations with IF-2 and SUPPOSE-2 also occurred. Eleven of these fifteen instances were produced by the same signer, which suggests that this structure may be a peculiarity of this specific signer. Still, it is interesting that we observed doubling in other signers as well, and in various combinations. An example is shown in (20):

(20) *C0532, signer 26, 01:09.073*

br bf

IF-1 SUPPOSE-1 DEAF / DOES.NOT.MATTER

'If, suppose that, [the child] is deaf, it doesn't matter'.

A possible explanation for the occurrence of this pattern could be that doubling serves to express emphasis. Alternatively, we observed that our deaf informant sometimes uses SUPPOSE-1 in contexts where she means 'for example'. Thus, it is possible that SUPPOSE is extending its meaning and that signer 26 uses it in this combination: 'if, for example…'. Conversely, it might be the case that the sign is losing some of its conditional meaning and the signer therefore wants to stress that he uses the sign with a conditional sense. Our deaf informant is not familiar with the combined construction in (20) but argued that sociolinguistic factors and individual preferences might account for the pattern as well. We leave this issue to further research.

4.1.5 Manual markers of the main clause

In some cases, the main clause was also introduced by a sign, comparable to *then* in English. The three signs that we encountered in this context were THEN (Dutch gloss DAN), CONSEQUENCE (Dutch gloss GEVOLG), and MEAN (Dutch gloss BETEKENEN). However, it is clear that use of one of these signs is not obligatory, as they occurred quite infrequently. An example in which the sign THEN is used is given in (21):

(21) C0014, S03, 00:09.020

htf hs

br bf

IF-2 IX$_1$ PARENTS HEARING / IX$_1$ ORAL / THEN CAN-NOT ADAPT SIGNS INTERNATIONAL

'If my parents had been hearing, and I had been [raised] orally, then I wouldn't have been able to adapt to international signs.'

4.1.6 Summary manual marking

To sum up, we have analyzed 357 sentences with a manually marked conditional clause. We found seven manual markers in total for the CC, although the use of these signs is optional. The IF-markers are generally accompanied by its standard mouthing *als*, whereas the SUPPOSE-markers can be expressed with various mouth actions. In some cases, two manual markers were combined within the CC; most often this involved IF-1 and SUPPOSE-1. In addition, three markers that introduce a main clause were found but these were infrequent. Variation was found both between and within signers, meaning that multiple signers used varying signs when expressing a CC.

4.2 Nonmanual marking

In the following section, we describe the nonmanuals that we analyzed per articulator. Remember that this description is based on 50 CCs without manual marker and 71 CCs with manual marker.

4.2.1 Head movement, tilt and nod

We distinguished between head movement (the whole head moving forward or backward), head tilts (the head remains in the same position but the chin moves up,

down or sideward), and head nods. Regarding head movement and tilt, we also distinguished between marking the whole CC or only a part of the CC (i.e. the scope). In contrast, head nods are punctual markers and occurred either during the last sign of the CC, or right after it. The results are visualized in Figure 4. Please note that the categories are not mutually exclusive; a CC could, for example, be marked in its entirety by a head movement and partially by a head tilt.

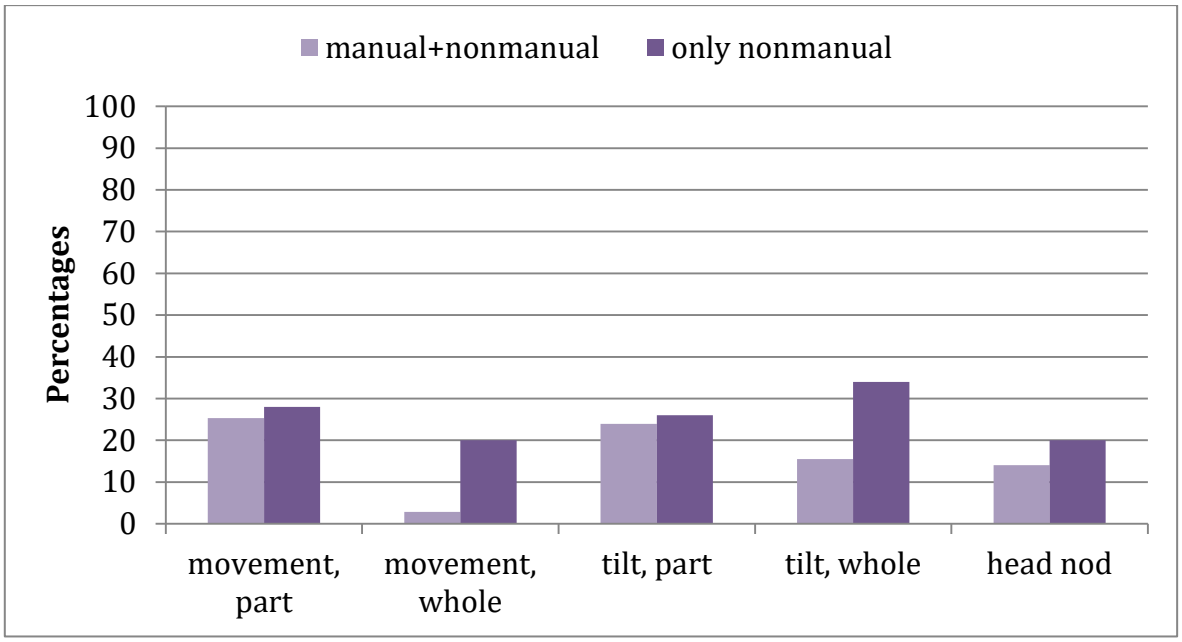

Figure 4. Percentages of CCs with and without manual conjunction that (partially) involve head movement and/or head tilt and/or head nod.

It is clear that none of these features are attested in a majority of CCs, the highest percentage of occurrence being 34% (whole head tilt in sentences marked only nonmanually); in other words, none seems to be a clear grammatical marker of CCs. Moreover, in the majority of cases, the scope of partial tilts and movements did not include the sign IF/SUPPOSE. Example (22) illustrates this pattern:

(22) C0531, S25, 00:39.440

hmf+htf

br

IF-1 TURN.OUT PRESENT DEAF CHILDREN / (…)

'If it turns out that deaf children are present (…)'

What is striking in Figure 4 is that sentences without manual marker show higher percentages of head marking for all categories compared to the sentences with manual marker. Importantly, the distinction between partial and full marking of the CC is not usually made for other SLs. It therefore makes sense to combine the two categories in Figure 5:

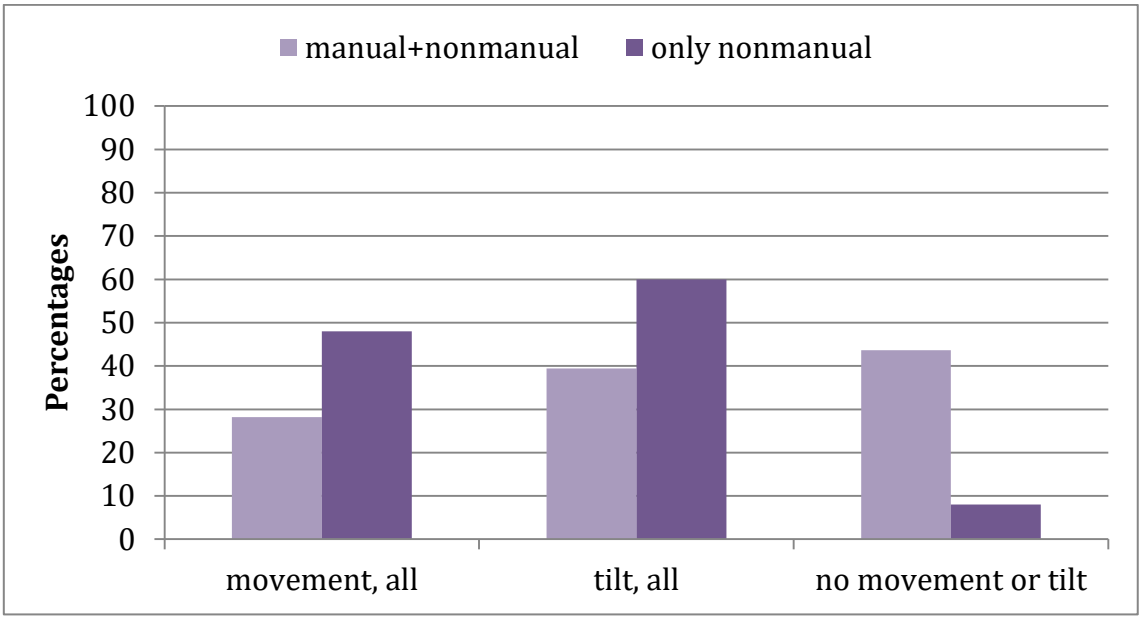

Figure 5. Percentages of CCs with and without manual conjunction that involve head movement, head tilt or neither.

Now, it becomes clear that there is a tendency for CCs without manual marker to be accompanied by a least one of the two nonmanual head markers (i.e. movement and/or tilt). Moreover, only 8% of the CCs without manual marker is not marked by a head marker. This could suggest that these markers are two expressions of the same feature. We will discuss this possibility further in Section 5.1.3.

To find out whether the differences in frequency of head movement in sentences with and without manual conjunction is significant, we used *R* (R Development Core Team 2008) to apply the *glmer* function[19] to our data to fit a mixed-effects linear model of head movement as a function of presence of a manual marker. It turns out that head movement occurs significantly less frequently in sentences with a manual marker (odds ratio 0.42, $p = 0.03$, z = 2.21, 95% confidence interval from 0.19 to 0.90). The same was

[19] Generalized linear mixed-effects model, executed with the lme4 package (Bates et al. 2015).

done for head tilt and we found that head tilt was also significantly less frequent in sentences with a manual marker (odds ratio = 0.28, p = 0.02, z = 2.32, 95% confidence interval from 0.08 to 0.74). This means that, as might be expected, nonmanual marking is more likely to occur when the CC does not include a manual conjunction.

Regarding the direction of head movements and tilt, we found that the majority of all movements and tilts went forward: 95% of the movements in CCs with manual marker; 92% of the movements in CCs without manual marker; 39% of the tilts[20] in CCs with manual marker, and 73% of the tilts in CCs without manual marker. However, backward and sideward movements and tilts were observed as well. Example (18) and (22) above show CCs with a forward head movement.

4.2.2 Eyebrow position

We analyzed whether the eyebrows were furrowed, raised or neutral, and whether the whole CC was marked or only a part. The results are shown in Figure 6. Note that the categories of partial marking are not mutually exclusive; in other words, a conditional could be accompanied partially by furrowed and partially by raised eyebrows.

It is clear that both frowning and raising of the eyebrows occurred but that raised eyebrows occurred more often. Still, the eyebrows were not as frequently raised as one might have expected based on previous research on other SLs (see §2.2.2). In fact, 32% and 22% of the sentences with and without manual marker, respectively, were not marked by any eyebrow movement.

Regarding sentences in which only a part of the CC was marked, we again looked whether the scope of the marking included the manual marker. The pattern here is comparable to the one mentioned above (§4.2.1); the sign IF/SUPPOSE does not need to be marked and the eyebrows often mark another part of the CC instead (see example (22)).

[20] This percentage is quite low compared to the others. After examination of the instances of tilts in other directions we believe most of them are triggered by pragmatic reasons, e.g. the marking of contrast.

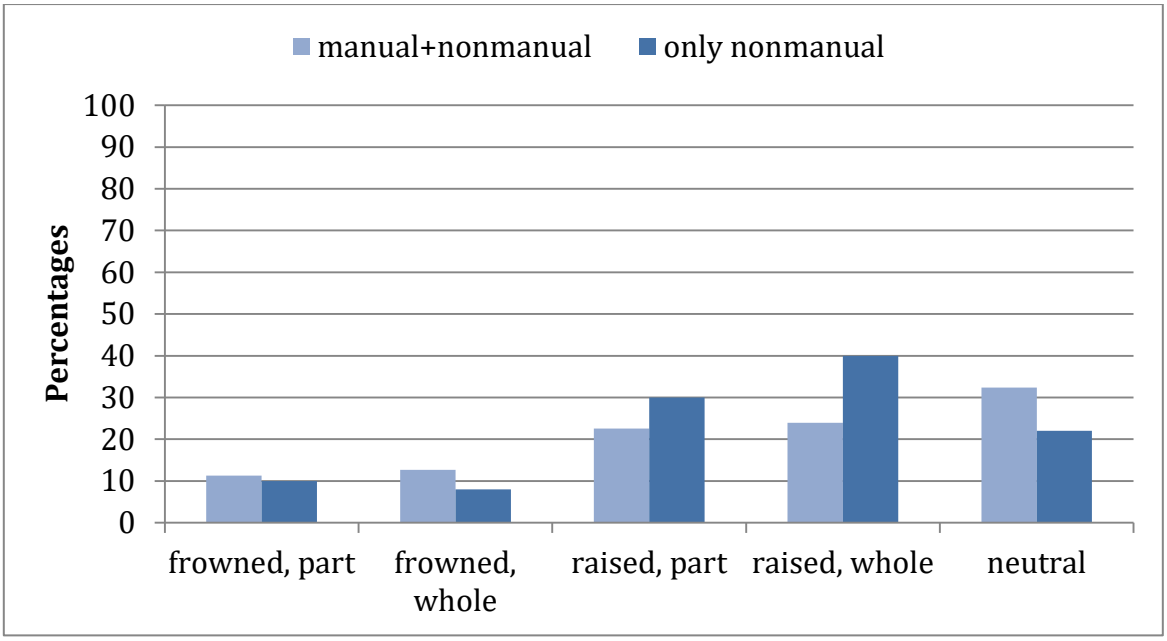

Figure 6. Percentages of CCs with and without manual conjunction that (partially) involve furrowed, raised or neutral eyebrows.

Once more, to allow for comparison to other SLs, leaving out the distinction between partial marking and whole marking could be useful. We then see that eyebrows are raised over at least part of the CC in 47% of CCs with and 70% of CCs without manual marker (Figure 7). The difference between sentences with and without conjunction is significant; the eyebrows were less frequently raised (instead of furrowed or neutral) in sentences with manual marker (odds ratio = 0.34, p = 0.01, z = 2.46, 95% confidence intervals from 0.13 to 0.76). Examples (19) – (22) above show CCs with raised eyebrows, with varying scopes.

An interesting result was that the eyebrows did not always lower after the CC: sometimes they remained raised during the main clause. An explanation for this could be the fact that raised eyebrows fulfill several syntactic and pragmatic functions in NGT, e.g. expressing surprise. Still, considering the frequencies in Figure 7 and the significant difference between sentences with and without manual marker, we consider raised eyebrows a grammatical marker of conditionals clauses in NGT, whereas furrowed brows are not.

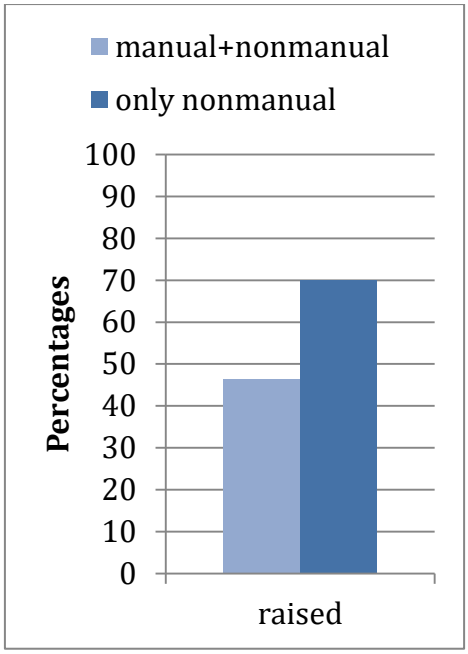

Figure 7. Percentages of CCs with and without manual conjunction in which the eyebrows are raised.

4.2.3 Eye gaze, widening and squinting

We wanted to do some exploratory research on eye gaze, since few such studies are available for NGT. For each CC, we therefore attempted to distinguish between eye gaze at the conversation partner and anywhere else, but this quickly became too complex. Furthermore, there is no evidence to believe that eye gaze is a conditional marker, and we agree with Coerts (1992) and Crasborn & van der Kooij (2013) that its functions are probably similar to eye gaze functions in other SLs, for example turn regulation. We therefore do not treat eyegaze as a conditional marker here.

We further analyzed eye aperture in more detail. We noted whether the eyes were widened, squinted or neutral and the scope of the marking. None of the categories seems to be a specific marker of CCs, as none of the categories reached high frequencies (see Figure 8). In addition, there is no evidence for a difference of occurrence between sentences with and without manual marker.

Since Dachkovsky (2008) claimed that counterfactual CCs in ISL are marked with squinted eyes, we paid specific attention to the occurrence of squinting in our data. We asked a deaf informant about her intuition concerning a potential relationship between squinting and counterfactuality in NGT, and she has the intuition that squinted eyes are important for marking high hypotheticality. Counterfactual CCs are considered highly

hypothetical (Comrie 1986), thus, it could be that squinted eyes are indeed a marker of counterfactual CCs in NGT as well. However, we could not confirm this hypothesis with our data. As described in §3.3.3, finding clear examples of counterfactual CCs is challenging. We found only one example with squinted eyes accompanying a part of the CC and a clear nonfactual meaning in our corpus data, which is shown in (23).

(23) *C0132, S08, 01:57.034*

htf

bf

ew es

SUPPOSE-1 PERFECT WORLD / MEAN LEARN NOTHING

'Suppose we had a perfect world, it would mean we'd learn nothing.'

However, we also found one example of a clear counterfactual without squinted eyes. We therefore conclude that we found no evidence for a formal distinction between factual and counterfactual CCs in NGT, specifically not one that is marked by eye-aperture.

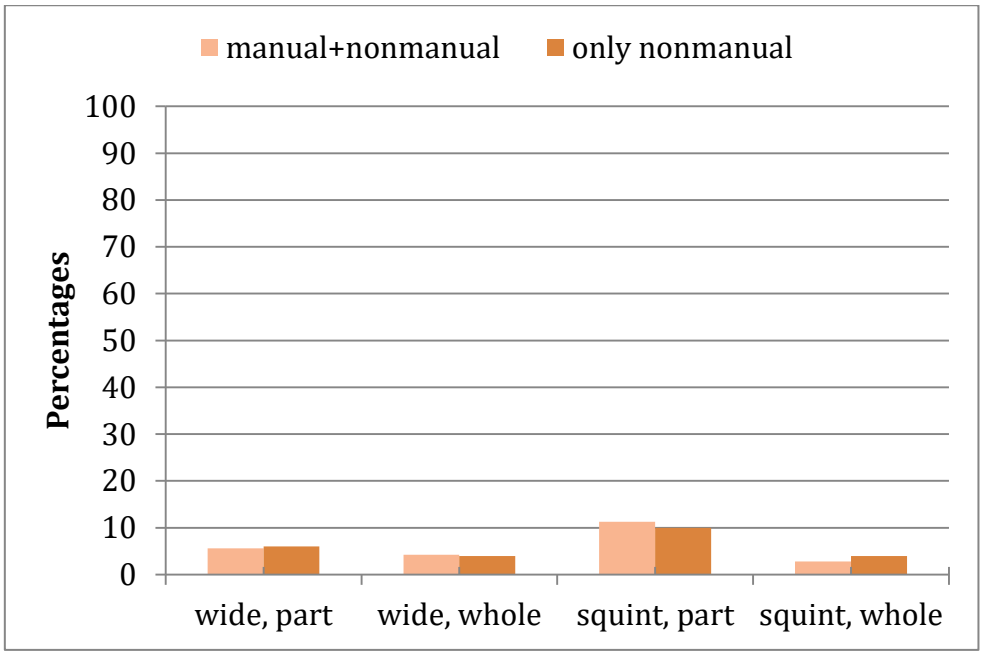

Figure 8. Percentages of CCs with and without manual conjunction that (partially) involve widened and/or squinted eyes.

4.2.4 Mouthings without manual sign

There are thirteen sentences (26% of all CCs without a manual marker), signed by eight different signers, that deserve specific attention here; these are CCs without manual marker but with the presence of a mouthing in the sentence-initial position. In twelve of these cases, the mouthing was the Dutch conjunction *als* and in one case, it involved the Dutch conjunction *stel.* Using an "added mouthing"[21] is not an infrequent phenomenon in NGT (Bank et al. 2016; Schermer 1990). In example (24) *als* is articulated while the signer is raising her hands to sign BROTHER.

(24) C0060, S05, 01:00.426

als broer kies oké

BROTHER IX3 3PICK / PALM.UP O-K

'If my brother picks that option, [that's] okay.'

When such sentences also involve partial marking by the eyebrows or head, the mouthing is not necessarily articulated simultaneously with nonmanual markings. That is, the mouthing can remain unmarked, and the eyebrow and/or head movement mark another part of the CC. In this respect these "mouth markers" behave similarly to the manual markers.

4.2.5 Concluding remarks nonmanual markers

A set of 121 CCs (50 without manual marker, 71 with manual marker) was analyzed for the following nonmanual elements: head movements, tilts and nods, eyebrow position, eye aperture, and body leans. The majority of conditionals in NGT is marked by head movement and/or head tilt spreading over a part of the CC or the entire CC, especially if there is no manual marker. In addition, 46% of CCs with manual marker and 70% of CCs without manual marker are at least partially accompanied by raised eyebrows. These nonmanual markers therefore seem to be optional rather than obligatory; furthermore, they do not need to spread over the whole conditional or over the manual marker. In addition, some CCs are not marked by nonmanual signals at all. Head nods, furrowed

[21] Added mouthings are mouthings that are expressed while the hands articulate another sign or are in transition between two signs (Bank et al. 2016). The mouthings in (24) are in Dutch, and translate to: *if brother pick okay.*

eyebrows, eye aperture, and body leans[22] were infrequent and are therefore not considered nonmanual markers of CCs in NGT.

4.3 Peripheral CCs

We encountered nine clear instances of peripheral CCs in our dataset. Remember that semantically, peripheral CCs provide a motivation for expressing the main clause, rather than a condition on which the fulfillment of the main clause depends (exemplified in (5) above). However, formally, they look like regular conditionals: four different manual markers are used in our subset, and one peripheral does not include a manual conjunction at all; six out of nine are marked by raised eyebrows (three by furrowed eyebrows); there is a head tilt in four of them and a head movement in six of them. In one of the peripherals, a manual marker of the main clause occurs (DAN, 'then').[23]

Two examples of NGT peripherals are provided below. In (25), the decision being taken is clearly not dependent on one talking about NGT. This CC is introduced by the manual marker IF-1 and accompanied by raised eyebrows and partially by a head movement. In (26), the substraction of hours is not dependent on the signers thinking about this in a certain way. Here, the CC is marked by the manual marker SUPPOSE-1 and also by raised eyebrows.

(25) C0822, S36, 02:49.880

hmf

br

hn

IF-1 TALK ABOUT DUTCH SIGN^LANGUAGE / LOGICAL UTRECHT DECIDE

'If you talk about NGT, it's logical that Utrecht decides.'

[22] Bodyleans were present in 14% and 4% of sentences without and with manual marker, respectively.
[23] Interestingly, as this peripheral was of the meta-linguistic type, this fits our suggestion from §2.1.2 that meta-linguistic peripherals tend to employ markers like 'then', whereas non-meta-linguistic peripherals might not employ them.

(26) C1916, S78, 03:21.840

br

SUPPOSE-1 LIKE.THIS THINK / HOURS SUBTRACT++

'If you think about it that way, many hours are subtracted.'

5. Discussion

Taking stock, we found the following patterns of marking conditional clauses in NGT:

i. by one (or two) manual marker(s);

ii. by nonmanual marking only;

iii. by a combination of manual and nonmanual marking;

iv. without overt marking.

An important question that our results raise is where this variation comes from, and how it relates to patterns in other (sign) languages. In Section 5.1, we discuss several factors that could partially explain the variation. In Section 5.2 we look at our findings from a cross-modal typological perspective.

5.1 Variation

5.1.1 Relation between CC type and (non)manual marking

The first possible explanation we consider is that there are systematic correlations between certain markers and certain types of conditionals. As we described in §2.1.1, such a correlation has been found in ISL, where squinted eyes accompany counterfactual CCs (Dachkovsky 2008). However, we have not found such a systematic pattern in NGT, possibly because neutral and counterfactual CCs are difficult to distinguish based on only the semantics (see §3.3.3). Elicited data could provide more insight in this matter.

Interesting with respect to other possible relations between form and function is the suggestion of Comrie (1986) to treat hypotheticality in CCs as a continuum instead of a bilateral distinction (i.e. neutral vs. counterfactual). Hypotheticality is defined as "the degree of probability of realization of the situations referred to in the conditional"

(1986: 88), meaning that counterfactual CCs have high hypotheticality while factual CCs (i.e. neutral CCs of which the speaker already knows are true) have low hypotheticality. As an example, Comrie mentions Maltese, where different conditional conjunctions indicate a different degree of hypotheticality. For NGT, one could hypothesize that SUPPOSE and IF indicate different degrees of hypotheticality as well. According to a deaf informant, this is not the case. However, she did identify eye squinting as a marker of high hypotheticality in NGT. Further studies, potentially in the form of a grammaticality judgment task, could investigate the relation between hypotheticality and use of particular manual and nonmanual markers of CCs.

There is one category of conditionals that we looked into in more detail, since this group was easier to identify semantically; these were the peripheral conditionals. Although we found only nine clear instances of peripherals, we can conclude they do not display specific form characteristics: they showed considerable variation, too, and did not employ a specific marker.

5.1.2 Sociolinguistic variation

Some of the variation in the use of manual markers can be attributed to sociolinguistic factors. As described in §3.2, there is regional lexical variation in NGT (Schermer 2004), and this could account for part of the variation. In particular, signs IF-2 and IF-3 are both only used by signers from the Groningen region (see Table 1, Section 4.1). For the sign IF-1, we find that 18 out of 23 signers who produced the sign are from the Groningen region. Although we must keep in mind that the different regions are not equally represented in the Corpus NGT for various reasons, these results suggest that the extent of lexical variation is particularly large in the Groningen region. Regarding nonmanuals, we compared frequencies of nonmanuals in signers with different sociolinguistic backgrounds. Specifically, we statistically compared the absence : presence ratio of raised eyebrows, head tilt, and head movement between signers from different regions, genders, and ages. We found no evidence for differences between these sociolinguistic groups (for the models and the exact results, see Appendix B). We believe that region, gender and age are the most relevant sociolinguistic factors for NGT; however, it could still be the case that other sociolinguistic factors are at play. We leave this open to further research.

5.1.3 Other variation

Linguistically motivated variation, such as the occurrence of allomorphs due to the linguistic context, also offers an explanation. We consider the use of SUPPOSE-1 (articulated with the W-handshape) or SUPPOSE-2 (articulated with the B-handshape) as an example of this type. As mentioned in Section 4.1.2, we noted that the articulation of 21 out of 28 instances of SUPPOSE-2 could have been affected by other linguistic factors. To be more precise, in 15 cases the preceding or following sign also had a B-handshape. In six cases the influence was less direct but could be attributed to either the non-dominant hand articulating signs with the B-handshape simultaneously with the dominant hand signing SUPPOSE-2, or the mouth articulating a concept that would require a sign with the B-handshape but was expressed by a mouthing only (e.g. the NGT sign MAAR 'but'). For the other seven sentences the phonological realization of SUPPOSE-2 did not appear to be affected by the linguistic context. The choice for SUPPOSE-1 or SUPPOSE-2 might also be dependent on personal preference.

Two other signs that look similar to one another and hence could be related are the signs IF-3 and IF-4. It is possible, for instance, that IF-4 has lost its movement and that the handshape adapted from E to D, and thus developed into IF-3. This hypothesis is in line with the fact that we only found older signers using IF-4 and younger signers using IF-3, but the frequencies are quite low so this remains speculative.

As for nonmanual markers, it is striking that there is no clear pattern or fixed combination of nonmanuals in our dataset. Crasborn & van der Kooij (2013: 550) suggest that various phonetic cues might be expressions of the same feature; for example, when marking focus in NGT, raised brows, widened eyes and head movement forward could be expressions for marking the feature [open up!]. Our findings with respect to nonmanuals could be accounted for along similar lines, as none of the more frequent nonmanual markers (raised eyebrows, head tilt, head movement) seems to be an obligatory marker on its own; rather, it seems important that at least one of these markers is used for realizing the [conditional] feature. Coerts (1992) made similar observations concerning polar interrogatives in NGT; she suggested that 'eyebrows up' is the most frequent marker for polar questions, but if the eyebrows are neutral, other nonmanuals replace their function. This tendency could indeed be explained if the nonmanual signals share an underlying phonological feature.

5.2 Typology

5.2.1 Semantic types

As described in Section 2.1.1, a formal distinction between neutral and counterfactual CCs has been observed for conditionals in ISL and RSL (Dachkovsky 2008; Burkova & Kimmelman 2017). Although our deaf informant was convinced that hypotheticality plays a role and that this is marked by squinted eyes, we did not find such a dedicated marker in our corpus data. The difference between factual and counterfactual CCs in NGT is, therefore, still an open issue.

We did find peripheral conditionals in our dataset, and although this type has not been reported for other SLs, we expect it to exist in other SLs as well. Since formally, peripherals in NGT look like regular conditionals, they seem to fit typological patterns (based on spoken languages). We observed variation in both manual and nonmanual marking, and there is no dedicated marker for this category.

5.2.2 Syntactic structure

The clause order that conditional sentences in NGT show – the antecedent preceding the consequent – is cross-linguistically the most frequent order, and in the SLs that have been described, it seems to be the only available order. Also in line with what has been described for other SLs, the use of one of the various manual conjunctions is optional. The fact that NGT conditionals do not require a manual conjunction is in itself not striking; however, from a typological perspective, it is interesting to note that the conditionals without manual conjunction are, in various SLs, typically marked by raised eyebrows – a nonmanual that also marks polar interrogatives in many SLs (Zeshan 2004). Consequently, the distribution of interrogative-like strategies vs. other strategies is different from spoken languages, where the former seem rather infrequent and typologically marked. In contrast, across SLs, the use of only a nonmanual which also marks interrogatives is extremely common. One must keep in mind, however, that the exact occurrence ratio of strategies is difficult to determine: manually marked and only nonmanually marked CCs might well be evenly frequent in the corpus NGT, for instance, but clearly, it is easier to find CCs of the former category in a corpus.

In all studied SLs, raised eyebrows are the most frequent nonmanual marker of CCs. For NGT, however, this is less clear-cut: raised eyebrows appear not to be an

obligatory marker when the CC contains a manual marker. In the absence of a manual marker, the frequency of CCs that are fully marked by raised eyebrows is 40% in our sample. Once we add nonmanually marked CCs that are only partially marked by raised eyebrows, however, the frequency rises to 70%. It is highly likely that this difference between NGT and other SLs is partly due to different methodologies. Previous corpus-based studies also revealed that corpus data present us with more variation, or even different patterns, compared to elicited data (e.g. Oomen & Pfau 2017 on negation in NGT; Geraci et al. 2015 on *wh*-questions in Italian SL).

As in several other SLs (e.g. ASL, Liddell 1986), CCs in NGT can be marked by the head as well. For NGT, we described head movement and head tilt as markers of CCs. Since only 8% of sentences without manual marker is *not* marked by head movement or tilt, the head might even be the most important nonmanual articulator for CCs in NGT. It is difficult to compare our patterns to other SLs, as most of the descriptions do not provide frequencies, but the occurrence of head movement and tilt seems common. Interestingly, the direction of head tilts differs per language: whereas NGT and ISL (Dachkovsky 2008) mark CCs with a downward head tilt, Auslan marks them with a backward tilt (Johnston & Schembri 2007).

As reported in Section 4.2.4, we found thirteen CCs which were introduced by a mouthed conjunction without a manual component. To our knowledge, this strategy has not been described specifically for CCs in other SLs; however, it has been reported for other grammatical elements (e.g. *wh*-questions marked by only a mouthing, Zeshan 2004). We therefore do not consider this a typologically particularly striking feature.

To sum up, although there are some patterns which we cannot compare thoroughly to other (sign) languages, we conclude that formally, conditional clauses in NGT fit well into cross-linguistic syntactic patterns. A crucial difference in comparison to previously described SLs is the amount of variation that the corpus data present us with, specifically regarding the position of the eyebrows.

6. Conclusion

Based on 407 sentences, extracted from the Corpus NGT, we investigated the syntactic realization of conditional clauses in NGT. We identified seven manual markers and three

nonmanual markers, namely head movement, head tilt and raised eyebrows. The markers do not occur in fixed combinations; rather, we found significant variation in their use and co-occurrence. This is in line with findings from other corpus studies, namely, that compared to studies based on elicited data or grammaticality judgement tasks, patterns extracted from corpus data are more variable. We were able to explain parts of the variation by (socio)linguistic factors and choice of methodology.

On the one hand, elicited data might be more suitable for identifying correlations between marking and type of conditional than corpus data. Moreover, the corpus does not provide us with information about impossible structures, i.e. with negative data. It might thus well be the case, that NGT allows for even more strategies for conditionals, but that these were not present in our sample. On the other hand, the corpus data have provided us with sufficient data to describe the patterns, and, to a certain extent, on the probability of the structures. Although the options for expressing conditionals in NGT are diverse, they generally align well with cross-linguistic patterns.

References

Baker, Charlotte Lee & Dennis Cokely. 1980. *American sign language: A teacher's resource text on grammar and culture*. Silver Spring, Md: T.J. Publishers.

Bank, Richard, Onno Crasborn & Roeland van Hout. 2011. Variation in mouth actions with manual signs in Sign Language of the Netherlands (NGT). *Sign Language & Linguistics* 14(2). 248–270.

Bank, Richard, Onno Crasborn & Roeland van Hout. 2016. Bimodal code-mixing: Dutch spoken language elements in NGT discourse. *Bilingualism: Language and Cognition*. 1–17. doi:10.1017/S1366728916000936.

Bates, Douglas, Martin Maechler, Ben Bolker & Steve Walker. 2015. Fitting Linear Mixed-Effects Models Using lme4. *Journal of Statistical Software* 67(1). 1–48. doi:10.18637/jss.v067.i01.

Burkova, Svetlana I. & Vadim Kimmelman. 2017. Russian Sign Language: Grammatical overview. Manuscript.

Coerts, Jane. 1992. *Nonmanual grammatical markers: An analysis of interrogatives, negations and topicalisations in Sign Language of the Netherlands*. PhD dissertation, University of Amsterdam.

Comrie, Bernard. 1986. Conditionals: A typology. In Traugott, Elizabeth Closs, Alice ter Meulen, Judy Snitzer Reilly & Charles A. Ferguson (eds.), *On conditionals*. 77–99. Cambridge: Cambridge University Press.

Crasborn, Onno & Els van der Kooij. 2013. The phonology of focus in Sign Language of the Netherlands. *Journal of Linguistics* 49(03). 515–565. doi:10.1017/S0022226713000054.

Crasborn, Onno, Els van der Kooij, Dafydd Waters, Bencie Woll & Johanna Mesch. 2008. Frequency distribution and spreading behavior of different types of mouth actions in three sign languages. *Sign Language & Linguistics* 11(1). 45–67.

Crasborn, Onno & Han Sloetjes. 2008. Enhanced ELAN functionality for sign language corpora. *6th International Conference on Language Resources and Evaluation (LREC 2008)/3rd Workshop on the Representation and Processing of Sign Languages: Construction and Exploitation of Sign Language Corpora*. 39–43.

Crasborn, Onno, Inge Zwitserlood & Johan Ros. 2008. *Het Corpus NGT. Een digitaal open accesscorpus van filmpjes en annotaties van de Nederlandse Gebarentaal.* Centre for Language Studies, Radboud Universiteit Nijmegen. URL: http://www.ru.nl/corpusngt

Dachkovsky, Svetlana. 2008. Facial expression as intonation in Israeli Sign Language: The case of neutral and counterfactual conditionals. *Signs of the time. Selected papers from TISLR 8*. Hamburg: Signum. 61–82.

Dancygier, Barbara. 1998. *Conditionals and prediction: Time, knowledge, and causation in conditional constructions.* Cambridge Studies in Linguistics 87. Cambridge: Cambridge University Press.

Dikyuva, Hasan, Bahtiyar Makaroğlu & Engin Arik. 2017. *Turkish Sign Language Grammar*. Ankara: Ministry of Family and Social Policies Press.

Dutch Sign Centre. Online dictionary, entry: STELLEN / STEL-JE-VOOR. www.gebarencentrum.nl. (Last seen Octobre 27, 2017).

Geraci, Carlo, Robert Bayley, Anna Cardinaletti, Carlo Cecchetto & Caterina Donati. 2015. Variation in Italian Sign Language (LIS): The case of wh-signs. *Linguistics* 53(1). 125–151.

Haan, Doatske de. 2015. *Modal clauses in Sign Language of the Netherlands*: *Grammatical structure and grammaticalization.* MA thesis, University of Amsterdam.

Haegeman, Liliane. 1984. Pragmatic conditionals in English. *Folia Linguistica* 18 (3/4). 485–502.

Haiman, John. 1978. Conditionals are topics. *Language* 54. 564–589.

Janzen, Terry. 1999. The grammaticization of topics in American Sign Language. *Studies in Language* 23(2). 271–306.

Johnston, Trevor & Adam Schembri. 2007. *Australian Sign Language (Auslan): An introduction to sign language linguistics*. New York: Cambridge University Press.

Kimmelman, Vadim. 2014. *Information structure in Russian Sign Language and Sign Language of the Netherlands*. PhD dissertation, University of Amsterdam.

Li, Charles N. & Sandra A. Thompson. 1981. *Mandarin Chinese: A Functional Reference Grammar.* Berkeley, CA: University of California Press.

Liddell, Scott K. 1986. Head thrust in ASL conditional marking. *Sign Language Studies* 52. 244–262.

Meir, Irit & Wendy Sandler. 2008. *A language in space. The story of Israeli Sign Language*. New York: Lawrence Erlbaum

Oomen, Marloes & Roland Pfau. 2017. Signing NOT (or not): A typological perspective on standard negation in Sign Language of the Netherlands. *Linguistic Typology* 21(1): 1-51.

Paulus, Liona. 2016. *Conditional clauses in DGS and LIBRAS: A systematic comparison.* Poster session. Paper presented at the FEAST [Formal and Experimental Advances in Sign Language Theory] Conference 2016, Venice, Italy.

R Development Core Team. 2008. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL: http://www.R-project.org.

Schermer, Trude. 1990. *In search of a language: Influences from spoken Dutch on Sign Language of the Netherlands.* PhD dissertation, University of Amsterdam.

Schermer, Trude. 2004. *Lexical variation in Sign language of the Netherlands.* https://www.gebarencentrum.nl/media/33555/92_file1.pdf. (downloaded October 15, 2016).

Schermer, Trude & Rita Harder. 1986. Lexical variation in Dutch Sign Language: Some implications for language planning. *Signs of Life. Proceedings of the Second European Congress on Sign Language Research (Amsterdam July 14-18, 1985)*, 134–141. Amsterdam: NSDSK.

Sutton-Spence, Rachel & B. Woll. 1999. *The linguistics of British Sign Language: An introduction*. Cambridge: Cambridge University Press.

Zeshan, Ulrike. 2000. *Sign language in Indo-Pakistan: A description of a signed language*. Philadelphia: John Benjamins Publishing Company.

Zeshan, Ulrike. 2004. Interrogative constructions in signed languages: Crosslinguistic perspectives. *Language, 80(1),* 7–39. https://doi.org/10.1353/lan.2004.0050

Appendix 1. Glossing conventions.

Our NGT examples are extracted from the Corpus NGT. They are introduced by the number of the video clip, the number of the signer and the timeslot the example starts: *C0015, S03, 01:00.426*. Examples from other sources are adapted to the following conventions:

SMALL CAPS are used to represent signs.
SIGN.SIGN a period is used if more than one word is needed in the gloss.
– is used to separate fingerspelled letters.
^ is used for compounds.
++ is used for repetition.
/ is used for clause boundaries.
CL stands for *classifier*, followed by a description of the classifier.
IX stands for *index*, and can be followed by one of the following subscripts:
$_1$ for first person, $_2$ for second person, $_3$ for an arbitrary location.
These subscripts can also be used to show the locations of agreeing verbs.
PRO stands for *pronoun.*

Nonmanual signals are represented through a line above the glosses and show the scope of the marker as well. The following nonmanuals are used in our examples:

br = brows raised;
bf = brows furrowed;
es = eyes squinted;
ew = eyes wide;
hmf = head movement forward;
hn = head nod;
hs = head shake;
htb = head tilt backward;
htf = head tilt forward;
hth = head thrust;
rot-r = head rotation to the right.

Appendix 2. Analyses of nonmanuals and sociolinguistic factors.

We were curious whether there were differences in the frequencies of raised eyebrows, head movement and head tilt between certain sociolinguistic groups. We used *R* (R Development Core Team 2008) to apply the *glmer* function to our data to fit a mixed-effects linear model of the presence of these nonmanuals as a function of region, age and gender. As for region, there was not enough data to include all regions, so we included only the three most represented regions, which were Groningen, Amsterdam and "Mixed" (the category Mixed contains various regions, see Section 3.2). Then, orthogonal contrasts were used: first we compared Amsterdam to Mixed, and second, we compared Groningen to the average of Amsterdam and Mixed. As reported in the Discussion, all the outcomes were non-significant, i.e. no evidence for differences were found. For those who are interested, the models and results are presented below.

<u>Head tilt ~ region+age+gender+(1|signer)</u>
No evidence for a difference between regions: odds ratio (+Mixed-Amsterdam) = 1.04, p = 0.96, z = 0.05; odds ratio (+Groningen-Mixed&Amsterdam) = 2.62, p = 0.06, z = 1.86.
No evidence for a difference between ages: odds ratio (+1 year) = 1.02, p = 0.24, z = 1.17.
No evidence for a difference between genders: odds ratio (+male) = 1.03, p = 0.96, z = 0.06.

<u>Head movement ~ region+age+gender(1|signer)</u>
No evidence for a difference between regions: odds ratio (+Mixed-Amsterdam) = 1.10 p = 0.91, z = 0.12; odds ratio (+Groningen-Mixed&Amsterdam) = 0.70, p = 0.44, z = -0.78.
No evidence for a difference between ages: odds ratio (+1 year) = 1.00, p = 0.92, z = 0.11.
No evidence for a difference between genders: odds ratio (+male) = 0.62, p = 0.29, z = -1.05.

<u>Raised eyebrows ~ region+age+gender(1|signer)</u>
No evidence for a difference between regions: odds ratio (+Mixed-Amsterdam) = 1.65 p = 0.53, z = 0.62; odds ratio (+Groningen-Mixed&Amsterdam) = 1.00, p = 0.99, z = 0.00.
No evidence for a difference between ages: odds ratio (+1 year) = 1.01, p = 0.54, z = 0.61.
No evidence for a difference between genders: odds ratio (+male) = 1.04, p = 0.92, z = 0.10.