Antisymmetry and sign languages: a comparison between NGT and LIS

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Chapter 1: Introduction

Sign languages are a challenge to linguistics since they share important features with spoken languages, whilst also being very different. For instance, like spoken languages, sign languages have sublexical structure, word order constraints and also well-known morphological features such as plural marking or verbal inflection. Yet, at the same time, the visual modality of sign languages can have an effect on these features. For these reasons, sign languages provide a good oppurtunity to test the applicability of theoretical frameworks that have mainly been developed on the basis of spoken languages. By examining their applicability to languages in the visual modality such frameworks can be tested or further refined. Generative grammar, for example, must be able to handle sign language data since this framework claims to be a universal theory. We must be able to determine universal linguistic principles which hold for all languages regardless of modality, and distinguish those from principles that only hold for spoken languages. If a principle is applicable to both spoken and signed languages, it is a good candidate as a language universal, but if it holds only for spoken languages it can be called, at best, a "speech universal" (speech being understood as the act of speaking words). In the same way we may find "signing universals" that hold within the domain of signed languages but not for the spoken modality (nor for other modalities in which language appears[1]). Language universals can thus be seen as those principles that abstract and summarize both the universals of spoken languages and the universals of signed languages. Of course, it is also the case that sign languages are different from each other, that is, they show a certain crosslinguistic variation (Meier 2002) that must be measured and put in relation to universals. In terms of the linguistic endeavour, sign languages offer a threefold opportunity: 1) finding similarities between spoken

[1] In this dissertation, I compare languages in the visual-gestural modality and languages in the oral-auditive modality. However, notice that also other modalities exist. For instance, tactile (sign) languages exist which are employed by deaf-blind people: they have yet another modality (i.e. tactile) different from both the oral and the visual ones. Here I will not discuss this modality, but the reader must bear in mind that future research has to be extended to all modalities in order to determine language universals. In fact, language universals are such only if they are valid across **all** modalities.

languages and sign languages (possible candidates for language universals); 2) finding differences between spoken and sign languages (modality specific universals, but not language universals); 3) determining the areas and range of variation between sign languages. By far the majority of research has been done on ASL and only recently have other sign languages been studied and crosslinguistic work been initiated. This dissertation aims to contribute to the three linguistic questions raised above by studying and comparing two unrelated sign languages, Italian Sign Language (Lingua dei Segni Italiana, *LIS*) and the Sign Language of the Netherlands (Nederlandse Gebarentaal, *NGT*). The aim will be to see to which extent notions taken from a generative X-bar framework, specifically antisymmetry, split-CP/DP and pied-piping, can be used and are useful in describing sign languages. This aim must be seen in the light of evaluating these notions in their applicability to languages regardless of the spoken or signed modality.

In this chapter, I will firstly describe some basic features of the syntax of sign languages that are relevant for the topic of this thesis (§1.1) such as sign order, use of space and nonmanual marking. Secondly, I will provide a theoretical introduction to the notions of antisymmetry, split-CP/DP and pied-piping (§1.2). In the next section (§1.3), I will briefly describe my methodology for making the comparison between LIS and NGT. Lastly I will outline the research questions and general organisation of the book (§1.4).

1.1 Sign language features

Making use of the visual modality, sign languages look very different from spoken languages. Indeed the difference is so striking that until fairly recently there was no general consensus that sign languages were languages at all[2]. On the other hand, sign languages appear very similar to each other – at least at first sight. Since the work of Stokoe (1960), we know that signs consist of some formational parameters[3] (handshape, position/location of the sign, and movement; later orientation of the palm

[2] Amongst linguists it is generaly accepted that sign languages are natural languages but outside this field, it is common to find that people wonder whether SLs have a grammar or are a jutxtaposition of intuitive signs without any linguistic structure.

[3] The term parameter as used here is not to be confused with the parameters of Universal Grammar which will be discussed later.

was added as a fourth parameter). In contrast, words are made of vowels and consonants, each with different features (e.g. voiced/voiceless, nasal, open, closed…). Sign languages have a sublexical structure like spoken languages but they are very different from spoken languages in the way this sublexical level is realized in the visual modality. In Italian, for example, the minimal pair *caro* 'dear', *carro* 'cart' only differs in the length of the consonant 'r'. In LIS the minimal pair SORRY (signed on the chin), MOTHER (signed on the cheek) differs only in the location of the sign, since both signs share the same handshape-A () (Volterra 1987:48), the same repeated movement and the same orientation toward the signer (Verdirosi 1987). Sign languages are, however, similar to each other in that all of them rely on these sublexical parameters. Nevertheless at a lower level, sign languages differ from each other in the closed set of values for each parameter. As a result, sign(s) in one language may not be realizable in another sign language[4]. Other similarities between sign languages include the way their phonology, based on the visual modality, encodes morpho-syntactic features: for instance, changes in the movement of a sign are usually related to verbal aspect or mood. Thus in imperative constructions the movement of the sign-verb is usually more tensed and quicker than in indicative forms, whereas a repeated verbal movement may indicate the iterative form of a verb. Finally, differences in the movement parameter may even distinguish nouns from verbs: Radutzky (1992) showed that in LIS, for instance, verbs (e.g. GROW) have usually a longer and nonrepeated movement wheareas corresponding nouns (e.g. GROWTH) have a repeated shorter movement.

The discussion above has dealt mostly with the phonology of sign languages, but, as stated in the introduction, sign languages have also their own morpho-syntactic features and constraints. If we want to analyze sign language syntax and morphology in order to discover possible common rules or patterns, the issue of typological variation is relevant. Meier (2002), following Newport & Supalla (2000), explicitly suggests that sign languages and spoken languages have different patterns of variation:

[4] This is much like stating that all spoken languages rely on consonants and vowels, even though they have different sets thereof.

> «In general, sign languages may not exhibit unique linguistic rules, but may display a more limited range of variation than is true of spoken languages.» (Meier 2002: 18)

> «Although signed languages differ in their vocabularies, in word order, in the presence of auxiliary-like elements, and in other ways, they seem on the whole to be much less diverse typologically than are spoken languages.» (Meier 2002: 20)

Meier also suggests that this would be due to «distinctive properties of the visual-gestural modality» as well as to «the youth of the languages that are produced and perceived in that modality» (Meier 2002: 20).

As stated in the introduction, it is an aim of this thesis to contribute towards separating out general language universals from possible modality universals. To this end, we must understand, for example, whether the more limited range of variation in signed languages is caused by the existence of some universals characteristic of all signed languages or whether it is just the result of some tendencies in the parametrical[5] setting of syntactic universals which in principle hold for every language, both spoken and signed. In other words, sign languages may appear less diverse typologically not because **all** of them lack (or show) one certain feature in their range of variation, but because **the vast majority** does. If just one sign language shares this particular feature with one or more spoken languages, we must conclude that the feature depends on the parametrical setting of some language universal; otherwise we can claim that it depends strictly on the visual modality. Meier himself hints at such tendencies (Meier 2002: 16):

> «Thus, the difference between signed and spoken languages may be this: signed languages generally opt for nonconcatenative morphology, but make occasional use of sequential affixes. Spoken languages generally opt for concatenative morphology, but make limited use of nonconcatenative morphology.»

He admits that we may be dealing not with the lack (or obligatory presence) of some feature in the ranges of variation, but rather with some

[5] Here the reference is to the parameters of Universal Grammar (see §1.2).

rare (or very frequent) feature. Comparing different sign languages with each other is thus as important as comparing sign languages with spoken languages. This section aims to briefly describe some prominent features of the syntax of sign languages that are interesting for cross-linguistic comparison: sign order, non manual marking, and the use of the sign space. I will also provide some information about the crosslinguistic variation between different sign languages found to date for these specific features.

1.1.1 Sign order

Communication can be achieved even in the absence of a fully-fledged language: some "mixed" gestures or words (e.g. 'help!' or 'I hungry…food…give') may be enough to convey basic messages, if the context is sufficiently clear and there is enough shared world knowledge. One of the characteristics that distinguishes language systems from communication systems is that the former (but not necessarily the latter) are subject to constraints, for instance, word order constraints. I am assuming here that different languages always have their own preferred order of elements in the sentence, although these may vary between languages, and that changes in this basic order are usually[6] motivated. Sign languages also have order patterns as spoken languages do, for example, with respect to verb, subject and object (see, for instance, Fischer (1975) and Liddell (1978) for ASL, Laudanna (1987) for LIS). The most frequent sign orders found to date are SVO, as is the case in American Sign Language (ASL) (1.a), for instance, and SOV, as in both LIS (1.b) and NGT (1.c).

1.

a. JOHN BUY HOUSE [ASL: Neidle et al. 2000: 81]
'John is buying a house'

b. GIANNI ACQUA BERE [LIS: Bertone 2007: 161]
Gianni water drink
'Gianni drinks water'

[6] I will not further discuss the question of configurational vs. non-configurational languages in this dissertation.

c. MAN BOEK OUD KOPEN [NGT: Baker 2008: 25]
man book old buy
'The man buys the old book'

Evidence for the existence of a linear ordering in sign languages comes also from the fact that changing the ordering of signs conveys a different meaning. As chapter 4 will further explore, topicalization, for instance, in sign languages involves the fronting of lexical material, as is often the case in spoken languages, too. Thus, topicalized constituents are fronted in LIS (2.a) and NGT (2.b) as they are in Italian (2.c).

2.

a. top
WATER IX**,** GIANNI DRINK ALWAYS [LIS]
'(As for) The/that water, Gianni always drinks it'

b. top headnod
BOOK OLD IX**,** MAN BUY [NGT]
'(As for) The/that book, the man buys/bought it'

c. Il/Quel film, l' ho già visto [Ital.]
the/that movie, it-CLT have-1SG already seen
'(As for) The/that movie, I have already seen it'

Topicalized arguments, in sign languages, are usually separated from the rest of the sentence by intonational breaks (here represented with commas) and so-called nonmanual markers (see §1.1.2). The fact that topicalized objects (WATER, BOOK, movie) appear in sentence initial position shows that there is always a strong relationship between linear ordering of the elements and syntax, not only in spoken languages (2.c), but also in sign languages (2.a), (2.b). If linear ordering did not count at all in sign languages, it would be difficult to explain the relation between different sign orders and different syntactic operations. Studies on word order usually focus on the position of verb, subject and object, but there are also orders involved in the positioning of adverbs and negation with respect to the verb. On the same lines, within the DP, the word order refers to the position of adjectives, numerals and determiner with respect to the noun. As chapter 2 shows, such word orders have also been shown

to exist in sign languages (see Bertone (2007) for LIS; Vink (2004) for NGT; MacLaughlin (1997) for ASL).

Word order implies a linearity in organization. However, one striking difference between sign and spoken languages is that sign languages also allow for simultaneity (see a.o. Vermeerbergen et al. (2007)). Simultaneity can occur in the manual part of signing. That is, the signer sometimes can use two articulators, the two hands, to perform two signs at the same time, as in examples (3.a) and (3.b). Such simultaneous constructions do not most frequently occur in compound signs, as one might imagine, but tend to involve the co-occurrence of two different signs with different syntactic functions such as a verb and one of its arguments. For example, the verb can be performed with the one hand, while the other hand holds the sign which represents the object, possibly pronominalized or represented by a classifier. In other words sign orders can be SVO or SOV, but also S $\begin{matrix}O\\V\end{matrix}$ In both the NGT and LIS example (3.a),(3.b), the object HAND and the verb BITE are not only performed in the same location (LFT, that is, both to the signer's left), but also at the same time. In contrast, the subject, represented here by a pronominal index IX (RGT, that is, to the signer's right), precedes them on the time line. Both NGT and LIS informants have judged these sentences grammatical.

3.

a. IX_{RGT} $\begin{matrix}\text{BI TE}_{\text{LFT}}\\ \text{HAND}_{\text{LFT}}\end{matrix}$ [LIS]
'It bit(es) my hand'

b. IX_{RGT} $\begin{matrix}\text{BI TE}_{\text{LFT}}\\ \text{HAND}_{\text{LFT}}\end{matrix}$ [NGT]
'It bit(es) my hand'

Reciprocal forms of signed verbs also often rely on simultaneity (see, for instance, Pfau & Steinbach 2003). Each hand articulates the same verb at the same time, but in different (in fact, opposite) directions. When the phonological form of the sign does not allow simultaneity, for instance, when two hands are needed to articulate the sign, then each language switches back to its preferred sign order placing the signs on the time line according to one specific sequence. We must therefore conclude that,

although simultaneity must be taken into account as an apparently major difference between sign and spoken languages, sign languages base their syntax on sequential structures just like spoken languages do (for instance, see Pfau & Glück (2000) for a discussion of instances of pseudo-simultaneity). Only occasionally can sign languages "compress" their linear sequence.

Crosslinguistically, there is variation between sign languages with respect to word order. As mentioned above, there is general consensus that ASL is an SVO language. Kata Kolok, a village sign language of Bali recently studied by Marsaja (2008), also seems to be SVO. LIS and NGT have an SOV sign order like German Sign Language (Deutsche Gebärdensprache, *DGS)* (see chapter 3 for references and examples). Other differences in sign order may exist within the nominal domain, as this study will demonstrate. For instance, adjectives generally follow the noun in LIS, but they can precede it in NGT (see §2.1.4). In the present dissertation, different types of word order will be discussed in relation to the syntactic issues mentioned above.

In chapter 2, the order of elements related to the noun will be considered. Subsequently, in chapter 3, the order related to verb, negation, modals and some aspectual markers will be addressed. Order in different sentence types will be discussed in chapter 4. Finally, in chapter 5, I will discuss the orders of elements in some combinations of clauses, that is, I will address some sentences that consist of a matrix clause and a subordinate clause.

1.1.2 Nonmanual marking

In the early research on sign languages (Stokoe 1960), researchers focused on the phonology of signs in the manual part, that, is the information encoded with the hands. Later, increasing attention has been paid to nonmanual markers (NMMs), also called nonmanual components, that is, the linguistic information articulated by body parts other than the hands (a.o. Liddell (1978) and Bahan (1996) for ASL; Franchi (1987) and Pizzuto et al. (1990) for LIS; Coerts (1992) for NGT). At the same time as the hands articulate a sign, NMMs can be produced using orientation of the body, facial expressions (raise or lowered brows, open or closed eyes), direction of eye gaze, lip movements, and head movements. These NMMs can have diverse functions: lexical, morphological, syntactic, pragmatic. On the lexical level, for instance, lip movements or mouthings

usually, though not always, contribute to the "base form" of the sign by disambiguating signs that would otherwise be homophonous. In morphology, eye gaze and/or body shift may, under certain conditions, replace or contribute to mark verbal agreement (Bahan (1996) on ASL; Pizzuto et al. (1990) on LIS). Syntactic phenomena, too, can be marked by specific postures and facial expressions. For instance, topicalization is usually marked by "raised eyebrows" as in (2.a), (2.b) above. In this dissertation, since the focus is on syntax, only NMMs will be considered that encode syntactic features such as interrogativity, topicalization, negation, relative and conditional clauses.

NMMs may be superimposed on one sign, but can also spread over strings of signs, i.e. certain domains, thus marking entire phrases or clauses. As such, they resemble in many aspects some prosodic phenomena of spoken languages like intonation, which must also spread over lexical material (the words). The NGT example in (4) illustrates this spreading. The polar (i.e. yes/no) interrogative sentence in (4) is marked by raised eyebrows and head forward while its English counterpart has an interrogative intonation.

yes/no interrog .
4. WILLEN APPEL JIJ [NGT: Schermer et al. 1991: 191]
want apple you
'Would you like an apple?'

The spreading of NMMs is related to syntax as shown by their clear onset and offset boundaries. In the NGT example in (5), the boundaries of the topic nonmanual marker (raised eyebrows) and the negative nonmanual marker (negative "side-to-side" headshake) clearly distinguish the topicalized portion of the sentence from the negated part. For this reason, nonmanual markers are represented above the string of glossed signs with underscores indicating the duration of their spreading.

top neg.
5. STROKE , DARE [NGT: Coerts 1992: 226]
'To stroke (the lion), he didn't dare'

Example (5) also shows that NMMs can mark morphosyntactic features (although the status of NMMs is still a topic of research). In fact, Liddell

(1978) was the first to show that different NMMs systematically accompany interrogative clauses and negation in ASL. He also demonstrated that ASL has both internally headed and externally headed relative clauses marked by a special NMM. Many researchers have followed Liddell in studying NMMs in other sign languages (for example, Franchi (1987) and Pizzuto et al. (1990) for LIS; Coerts (1992) for NGT). In many sign languages it appears, for instance, that a facial expression "raised eyebrows" marks topicalization and, together with other NMMs, also yes/no questions. As chapter 5 illustrates, NMMs also mark conditional and relative clauses. They also mark LIS predicative adjectives derived from reduced relative clauses (Bertone 2007) and cleft constructions according to Branchini (2006). Moreover, as shown in chapter 4, NMMs distinguish yes/no interrogative clauses from wh-interrogative clauses.

As stated earlier, NMMs are comparable to prosody since they also spread. From the Italian examples in (6), it is clear that in spoken languages, prosody and syntax can be related. Comparing sentences[7] (6.a) and (6.b), for instance, interrogative intonation (indicated by '?') is often the only overt marker that distinguishes interrogative from declarative clauses:

6.

a. Vuole una mela [Ital. with neutral intonation]
want-3SG an apple
'(S)he wants an apple'

b. Vuole una mela**?** [Ital. with interrog. intonation]
want-3SG an apple?
'Does (s)he want an apple?'

Crosslinguistic research has shown that there is variation in the NMMs used in negative and interrogative clauses. Negation in NGT is signalled only by "side-to-side headshake" NMM, whereas in LIS, it is marked lexically by an obligatory specific negative sign NOT (which co-occurs with a NMM, according to Geraci (2005)). In DGS and Catalan Sign

[7] Italian examples are based on my intuitions as a native speaker of Italian. The interogative sentence (6.b) has a raising intonation absent in (6.a).

Language (Llengua de Signes Catalana, *LSC*), the co-occurrence of an obligatory headshake with an optional lexical sign NICHT/NO has been observed (Pfau & Quer 2002). Along the same lines, interrogative clauses in LIS are marked by NMM markers only, whereas in NGT they also display a sentence final lexical (i.e. manual) marker "palm-up" (PU). The same (manual or nonmanual) marker can also be used to mark different syntactic phenomena. Pfau (2006) points out that conditional clauses in NGT share the same NMM "raised eyebrows" with topicalizations, paralleling the behaviour of some spoken languages.

NMMs will be discussed in this dissertation where they are involved in the syntax of sign languages. The negative NMM will be discussed in chapter 3. Yes/no and wh interrogative NMMs will be analyzed in chapter 4. NMMs of conditional and relative clauses are dealt with in chapter 5. The topic NMM will be discussed in chapter 4, but it also appears in other chapters, because it is involved in a number of different constructions.

1.1.3 Sign space

Another important common feature of sign languages is their use of space to convey linguistic information. Crucially, the signing space is not only employed as a location for the articulation of a lexical sign, but may also serve morpho-syntactic functions. Different spatial locations can indeed encode referentiality in pronominalization and agreement. Not surprisingly, this very specific feature of sign languages has been extensively studied. Almost all sign languages analyzed to date appear to be similar in their use of space; thus, at least at first sight, Meier's (2002) variation hypothesis mentioned earlier is supported on the basis of this feature. Here, I will briefly address the issue of the use of space, of pronouns and verbal agreement.

In sign languages, pointing toward the signer's body encodes reference to 1st person (i.e. to the Speaker/Signer[8]), pointing towards the person who the signer has eye-contact with encodes reference to 2nd person (i.e. to the Addressee[9]) and pointing to every other location

[8] Speaker is used here with an abstract meaning, that is, not in the literal sense of "s/he who speaks words", but in a broader sense as "s/he who produces the utterance" in whatever language and modality.

[9] Addressee is meant here as both Hearer/Listener of a spoken utterance and as "s/he who looks at" a signed utterance.

encodes reference to 3rd person. Different 3rd persons can be distinguished: the most common way is to point to the right or left, encoding a 3rd "right" person and a 3rd "left" person, but occasionally also other locations can be determined. Using these locations, many sign languages can inflect the verb by changing its orientation and/or movement towards and from these locations (a.o. Padden (1990) for ASL; Pizzuto (1987) for LIS; Bos (1993) for NGT; Keller (1998) and Rathmann & Mathur (2002) for DGS)[10]. The use of space marks a great contrast between sign languages and spoken languages. In spoken languages, different phonological forms spell out the same pronominal meaning (e.g. 1st person singular pronoun in Italian/Dutch/Maori *io/ik/ahau*, or the 2nd person singular forms *tu/jij/koe*) and different verbal endings encode the same person. In contrast, sign languages point to the same locations. Crucially, the 1st, 2nd and 3rd person pronouns of signed languages clearly show a compositional nature. They all consist of the same deictic act of pointing (usually the index finger extended[11]), and this transparently expresses reference and appears in all persons. At the same time, different locations are used which directly correspond to the categories of Speaker and Addressee, that is pronominal persons. The 2nd person pronoun, which refers to the Addressee, results from the combination of pointing and the location indicated by the signer's eye contact. Likewise, the 1sg person pronoun, that is, reference to the Signer/Speaker, is literally pointing to the location of the signing person. In contrast, the personal pronouns of spoken languages are not easily decomposable into a variable part representing the Speaker or the Hearer and an invariable part which encodes reference for all pronouns both crosslinguistically and across persons. To the best of my knowledge, spoken forms *tu/jij/koe* 'you' and *io/ik/ahau* 'I' share no visible common morphemes although they are all referential.

[10] Kata Kolok (Marsaja 2008) is an exception, because it lacks overt verbal inflection almost completely. See further discussion below.

[11] To the best of my knowledge, this is by far the most frequently employed form to express personal pronouns in sign languages. Other configurations can be used (for instance B-handshapes), but, as far as I know, they serve emphatic or possessive functions (see §2.1.2). What is important here, is that once a configuration is chosen (be it a B-handshape or the index finger extended), it remains the same for all persons. Also notice that at least in LIS and NGT, the index finger extended may be used in possessive forms in addition to personal pronouns (see chapter 2).

Pronouns fall into a wider class of signs, the use of which is linked to the signing space, the so-called indexes. These are pointing signs (usually made with the index finger) which have various referential uses. Sometimes they are clearly recognizable as pronouns, locatives or demonstratives because of their position in the sentence or because of the NMMs which may accompany them. In other cases, their exact status is more vague. For instance, it may be difficult to determine whether they function as clitics or as agreement markers affixed to the lexical sign. Besides, indexes may be used either to refer to the location of a sign previously articulated or to assign a location to a sign. For instance, they may be employed to assign a location to nouns that require contact with the body and therefore cannot be positioned freely in the signing space, as in (7.b). Compare (7.b) with (7.a). In (7.a) the noun CHILD is articulated in a specific location (here, slightly to the right) and this location is subsequently used for verbal agreement. In (7.b) the sign MAN requires contact with the body and therefore cannot be articulated in any other location. It is therefore associated with a location using a nominal index (NIX). This index has a different function from the optional 1st person pronominal index (IX_1).

7.

a. (IX**1**) CHILD**RGT** **1**CALL**RGT** [LIS/NGT]
'I call the/a child'

b. (IX**1**) MAN NIX **RGT** **1**CALL**RGT** [LIS/NGT]
'I call the/a man'

As we see from these examples, inflecting verbs in sign languages consist of one handshape (representing the base meaning of the verb) which moves to and from different locations, whereas spoken languages rely on conventional phonological forms (e.g. suffixes). Verbal agreement is not the focus of this study, but it is necessary to explain this phenomenon briefly (see further discussion in §3.1.1). Many sign languages share the same system to encode the agreement of the verb with (one or more of) its arguments. They have a rich agreement marking based on the use of space, whereby the base-form of the sign-verb is moved and/or oriented in different directions matching the locations previously established for the arguments. In this way they can encode agreement with both

subject/agent and object/patient. As mentioned above, such systems have been found in ASL, NGT, LIS and DGS, for example, where verbs inflect by changing the start- and end-point of their movements (that is, their direction) as well as their orientation. In the LIS/NGT examples (7.a), (7.b), the verb CALL is performed near the signer's body (1st person subject) but moves and is oriented toward the location of CHILD/MAN (3rd person object). Note however, that this system is only used with some verbs, indeed called "agreeing verbs". There also exist another class of verbs, the so-called "plain verbs", which realize agreement in a different way and show more crosslinguistic variation. LIS, for example, uses special indexes, possibly clitics (Bertone 2007), which have a different status from usual pronouns as well as a different sign order. On the other hand, NGT (Coerts 1992, Schermer et al. 1991) has an agreement auxiliary sign OP (glossed "act-on" by Bos (1994)) and DGS has a similar auxiliary AUF, also glossed *Person Agreement Marker* (*PAM*). In (8.a) and (8.b) examples are given of another agreeing verb and in (9.a) and (9.b) of a plain verb in both LIS and NGT.

8.

a. $_{\mathbf{RGT}}$PHONE$_{\mathbf{1}}$ [LIS]

b. $_{\mathbf{RGT}}$PHONE$_{\mathbf{1}}$ [NGT]
'(S)he phones/d me'

9.

a. IX$_{\mathbf{RGT}}$ LOVE IX$_{\mathbf{1}}$ [LIS]

b. LOVE $_{\mathbf{RGT}}$OP$_{\mathbf{1}}$ [NGT]
'(S)he loves/d me'

Whereas in (8.a) and (8.b), LIS and NGT follow the same pattern and move the verb from a position related to 's/he' toward the position of the signer, in (9.a) and (9.b) they differ from each other. LIS uses indexes which have a shorter movement than the one of usual pronouns and are signed close to the verb. NGT uses the auxiliary OP (so called because it is accompanied by the mouthing /op/), the function of which is to mark person agreement but not tense.

Given this, a major difference emerges between spoken languages and sign languages. Spoken languages tend to have one agreement system and use it consistently, that is, all lexical verbs either inflect in the same way (e.g. Italian, Dutch), or they don't inflect at all (e.g. Chinese). Auxiliary of modal verbs may be exceptional in this respect (English modal verbs, for instance, lack the 3rd person singular present indicative ending *–s*). In the visual modality, however, sign languages may use different agreement systems depending on verb types: some verbs have full inflection, others no inflection, and still others a mixed inflection. In the oral modality, variation is therefore primarily **cross**linguistic while in the visual modality it can be **intra**linguistic. The different amount of variation we observe among sign and spoken languages may be just due to the fact that researchers have been looking mainly for crosslinguistic variation.

Nevertheless spoken languages still seem to display a wider variation ranging from "highly inflected" to "not overtly inflected". In contrast, many sign languages studied to date have some kind of agreement. From the point of view of the variation hypothesis, this would mean that sign languages do not display as much crosslinguistic variation as spoken languages. However, at least one striking counterexample exists for sign languages. Kata Kolok, a sign language used by both deaf and hearing people in a northern Balinese village, has been described as having no inflected verbs at all. According to Marsaja (2008: 168), Kata Kolok relies on «a strict SVO order» to disambiguate object and patient because its verbs do not change their direction and orientation to agree with the locations of their arguments [12]. In other words, Kata Kolok behaves much like an analytic language with respect to verbal agreement. Roughly speaking, we can say that LIS and NGT have a rich verbal agreement comparable to spoken languages like Basque, whereas Kata Kolok is at the opposite extreme, comparable to Chinese. This is particularly important since it proves that **in principle** there is crosslinguistic variation in the morpho-syntax of sign languages as there is in spoken

[12] Only one exception seems to exist, the possibility to change the direction of the verb BAANG ('give'): however, it has acquired this feature only recently and as an option, since it usually retains its base form regardless of its arguments. Note also, that the author hints at the possible presence/emergence of an auxiliary sign (Marsaja 2008:171) but it is not clear how the language is consistent in its use. In contrast, its use of SVO order seems to be more consistent.

languages, though there seem to be less variation between sign languages with respect to some aspects.

1.2 Theoretical framework

The theoretical framework adopted in this dissertation is that of Chomsky's Generative Grammar, in particular X-bar theory, using the concept of Universal Grammar. It is not the intention to provide a full review of this framework here, but to briefly describe the notions that are the focus of this thesis (split CP/DP, anti-symmetry and pied-piping) and the basic mechanisms of this approach. Knowledge of concepts such as "deep/surface structure" (Chomsky 1957), "movement", "thematic role" ("ϑ-role") is assumed.

Chomsky's work posits the idea of innate linguistic principles so that generative linguistics has automatically been involved in searching for Universal Grammar. In this perspective, natural languages share most of their underlying structure/organization and only some parametrical adjustment occurs in acquisition, which accounts for the different surface structures observed crosslinguistically. According to Chomsky's (1981) theory of **Principles and Parameters** (P&P), the range of (crosslinguistic) variation is restricted to setting the value of a definite number of parameters[13], whereas principles reflect universal biological laws holding for all natural human languages. In the following sections, the notions crucial for this study will be briefly described: X-bar theory, split-CP, antisymmetry, and pied-piping.

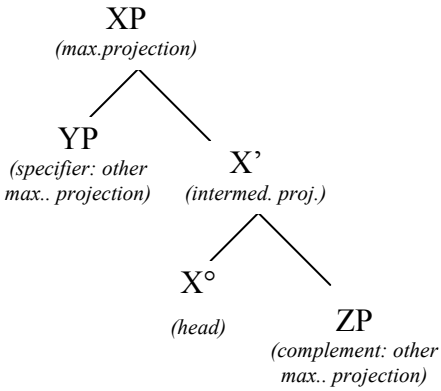
1.2.1 X-bar theory and its extension

The original proposal of the so-called X-bar theory (Chomsky 1970, Jackendoff 1977) restricts the phrase structure rules employed in describing syntax and states that in languages, lexical categories such as verbs and nouns have one deep **phrase structure**. In other words, the relations between such lexical categories are represented as relations between phrases, all of which have the same structure. The general phrase structure consists of one **head**, one **specifier** and one **complement** according to the schema in (10). The head (X°) is dominated by an

[13] Parameter here means parameter of Universal Grammar and is not to be confused with the *formational parameter(s)* which constitute the phonological building blocks of a sign.

intermediate projection (X'), which combines with a specifier (Spec) to build up a maximal projection (XP). The intermediate projection X' also dominates the complement (compl) of the head. X° determines the status of the maximal projection XP. Both specifier and complement are other maximal projections (YP, ZP).

10.



Thus, relations between categories such as Verb and Noun are defined as the result of structural relations between nodes in a tree of lexical phrases (VP, NP). Later, however, Chomsky (1986) suggested that languages have functional phrases that dominate the lexical phrases. X-bar theory should then be applied not only to lexical categories, but also to functional categories like, for instance, C(omplementizers) and I(nflection). According to this extended model, the functional phrase IP is taken to be projected above VP and the functional phrase CP is taken to be above IP. Along similar lines, Abney (1987) suggested extending this model further to the nominal domain with the functional phrase DP (the determiner phrase) projected above NP.

Further proposals have argued for a finer structure including more projections. First, Pollock (1989) suggested that the IP was not a projection in itself but was made up of two other projections (AgrP and T(ns)P) instead, responsible for subject agreement and tense marking, respectively. This followed from the observation that in many languages, the inflectional ending of a verb actually consists of a tense morpheme and a subject agreement morpheme. Ritter (1991) in turn proposed that

DP also comprises a projection for number (NumP). In fact, in a way, a split-DP hypothesis in embryo is present in Abney's (1987) proposal that at least some adjectives are hosted in dedicated projections located below DP (but above NP). Abney's (1987) treatment of APs is different from Cinque's (2000, 2005a) analysis, which I adopt in this dissertation. Nevertheless, the placement of at least some adjective projections between the NP and DP shows that, according to Abney (1987), the extended projection of a noun cannot consist of just one projection (the one for determiners).

Later research has argued for more subdivisions in both DP and IP. DP and IP have become labels actually representing groups of functional phrases or "subprojections" related to nouns and verbs, respectively. These functional projections somehow increase the features of the lexical base form (of verbs and nouns) multiplying the inflectional possibilites in a combinatorial manner (e.g. tenses×persons or genders×numbers). All this seems to entail some "parallelism" assumption between phrases, that is a kind of "proportional relation" between the noun with its functional projections and the verb with its functional projections that we may informally summarize as "NP is to DP subprojections as VP is to IP subprojections". This parallelism appears even stronger if we take into account Giusti's (1993) proposal for a case projection KP and a quantifier projection QP, both higher than DP. This suggested that some projections are above DP just as CP is above IP. Later a slight adjustment occurred in the names and position of projections. Szabolcsi (1994) proposed that DP is the counterpart of CP, while Giusti (1996) argued that **within** DP, there are some projections dedicated to topicalization or focalization, phenomena usually attributed to the CP domain (see §1.2.2). Different authors now assume that the DP contains discourse-related projections (Bernstein 2001, Aboh 2004, Giusti 2005). Crucially, for both nouns and verbs a threefold link appears between lexical and functional phrases since the earlier theories of splitting. First, there is a "lower" lexical area where thematic-roles (e.g. subjects, possessors, complements) are assigned. Second then, there is a "middle" functional area mostly related to agreement and modifiers (adverbs and adjectives). Finally, there is a "higher" area related to discourse phenomena such as focus, topic, quantification, case, subordination.

The different relations between phrases are formalized by Chomsky (1986) building on the definition of *c-command* (constituent command) first proposed by Reinhart (1976). Chomsky's definition reads as follows:

> α c-commands β iff α does not dominates β nor vice versa, and every node γ that dominates α dominates β. (Chomsky 1986: 8)

A certain freedom in linear ordering is still possible in this framework. Crosslinguistic variation as, for instance, SVO vs SOV word order was attributed to different parametric settings. Kayne's (1994) theory of anti-symmetry proposes a different account. I will come back to his account in §1.2.3.

1.2.2 Split-CP

Rizzi's (1997) theory of *split-CP* proposes that the CP projection be divided into many layers. The CP should therefore not be treated as one single phrase but as a group of various "subprojections", since it entails the presence of various phrases responsible for different syntactic phenomena. The split-CP can thus be seen as the continuation of other theories that previously proposed splitting, that is, subdividing IP and DP projections into further projections. In §1.2.1 we saw that the earlier theories of splitting suggested the existence, above both NP and VP, of distinct areas or layers containing either functional or discourse-related projections. A threefold parallelism emerged between noun-related and verb-related projections whereby, given two lexical categories Verb and Noun, the lower lexical layer VP can be seen as the verbal counterpart of the lexical layer NP, the middle functional layer IP appears as the verbal counterpart of the functional DP layer, and the CP layer appears as the counterpart of the higher (quantifier, focus, topic, case) projections related to the noun (the higher part of DP). Intuitively then, NP is to DP functional projections and to DP higher projections what VP is to IP functional projections and to CP:

NP : DP (funct.projections) : DP (high projections) ≈ VP : IP (funct.projections) : CP

Given this, it is predictable that also the label CP actually "covers" various higher, discourse-related projections above the IP area as there are various higher projections above the functional DP area. Indeed,

Rizzi's proposal for a split-CP fills the gap by claiming that CP, too, consists of a number of higher functional projections responsible, for instance, for focusing and topicalization (Top, FocP) in addition to the complementizer. According to Rizzi's (1997) first proposal, CP is structured as follows:

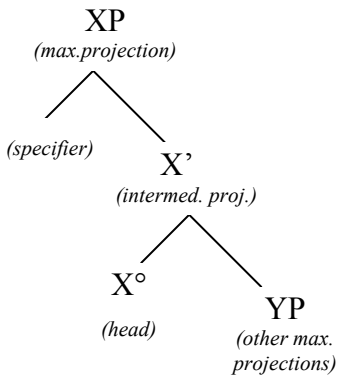
11. Force(P)…Top(P)…Foc(P)…Top(P)…Fin(P)

Below FinP, the IP layer begins. Later, more authors have argued for a finer structure of CP, which will be discussed in §4.2 and §5.2

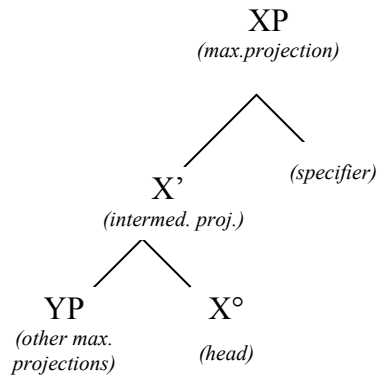
1.2.3 Antisymmetry

As previously seen (§1.2.1), X-bar theory posits a deep tree structure resulting from the combination of phrases which in turn share the same structure consisting of one head, one complement and one specifier. Yet, in its original formulation a certain freedom in the (linear) ordering of the tree-nodes was allowed. Some crosslinguistic variations (such as, for instance, surface SVO vs. SOV word orders) were ascribed to different parametric settings, in the light of P&P theory, which map the same universal hierarchical structure onto different linearizations. In other words, parametric variation determined whether the structure branches leftwards or rightwards. For instance, the three orders depicted in (12) to (14) were all compatible with the original formulation of X-bar theory, depending on whether the specifier and the complement are both to the right of the head, both to the left, or one to the left and the other to the right. Thus, for example, Specifier-Head-Complement (12), Specifier-Complement-Head (14), and Complement-Head-Specifier (13) were all possible combinations.

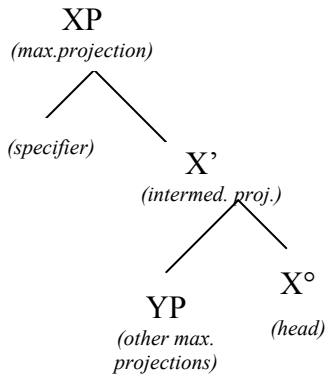
12. Spec-Head-Compl



13. Compl-Head-Spec



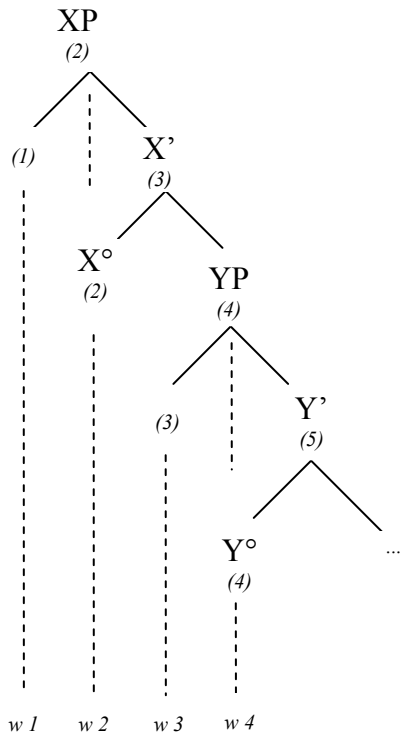
14. Spec-Compl-Head



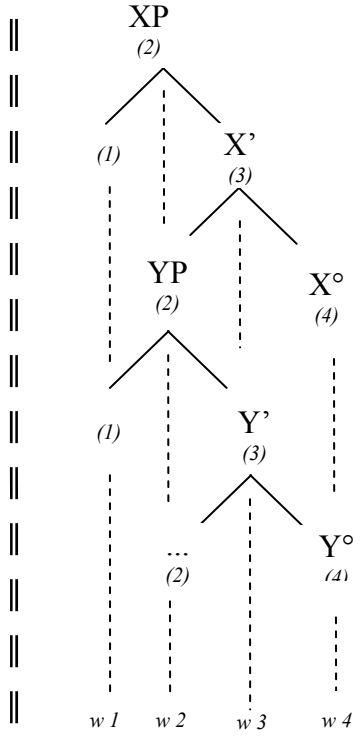
Kayne (1994) revised this theory, building on the definition of **asymmetrical c-command**. He proposed the *Linear Correspondence Axiom* (LCA) to map asymmetrical c-command onto linear ordering. X-bar theory is then not a primitive of UG but is derived. Crucially, the same rules which derive X-bar theory also entail that X-bar structure must be either Specifier-Head-Complement or Complement-Head-

Specifier. Intuitively, the fact that the structures such as Specifier-Complement-Head (14) are not suitable for linearization, while others such (12) and (13) are, can be represented in the following way. Let us imagine a very simple language which combines only two maximal projections. Let us also assume that this language has only one word for each specifier and one word for each head. The linear order will be represented by "*w 1*" as the first word on the left, increasing this number by +1 for each node on the right and decreasing it (-1) for each node on the left. The Spec-Head-Complement of (12) is then as in (15) and the Spec-Compl-Head structure (14) as in (16).

15. Spec-Head-Compl



16. Spec-Compl-Head



With respect to the linear ordering of words, the configuration in (15) intuitively represents the fact that precedence/subsequence derives

automatically from hierarchical syntactic relations (a relation which Kayne formulates more accurately in terms of antisymmetric c-command and LCA). Moving one node up or down in the structure (e.g. jumping between [Spec;XP] and X°) implies automatically one step forward or backward in the linear order. Crucially, the fact that specifiers are to the left of heads and heads are to the left of their complements translates automatically into a linear order when maximal projections are combined. In fact, the Spec-Head-Compl structure (15) is an example of Kaynean structure, which maps syntactic relations onto linear order. In (15) each maximal projection XP/YP is (vertically) aligned with its head X°/Y°: this means that, when a speaker of this hypothetical language hears a head in a certain position, he/she is also able to recognize that a maximal projection (a phrase) is there. This intuitively represents the assumption that the head determines the categorial status of the phrase since, for instance, when a verbal head is encountered, a verbal phrase is present and, when a nominal head is enconuntered, a nominal phrase is present. Of course, operations of movement may scramble this linear order (and indeed languages may have some syntactic ambiguities) but *in principle* this structure is unambiguous. Also note that the specifier of a projection can overlap the intermediate projection (X' /Y') of the higher phrase, but intermediate projections are never spelled-out so that no confusion can arise (intermediate projections, indeed, do not count as "terminal nodes" in Kayne's theory). If the opposite structure (Compl-Head-Spec) were applied, the ordering woul be simply reversed, with the specifier of XP as last word and Y° as the first word. No other major differences would arise. The linear order would still derive automatically from the position of specifiers and heads, when maximal projections are combined, as it did in (15). Informally, we can say that, with both Spec-Head-Complement and Complement-Head-Spec tree structures, each slot in the linear order (on the left-right axis) corresponds automatically to a distinct position in the syntactic hierarchy (on the up-down axis). The fact that these structures represent at the same time both linearization and syntactic relations in this one-to-one way represents graphically Kayne's assumption that there is a mapping relation between linear order and syntactic hierarchy/structure.

In contrast in (16), where both the specifier and the complement are to the left of the head (Spec-Compl-Head structure), the linear order does not derive automatically when maximal projections are combined. In (16),

maximal projections are not aligned with their heads: two heads (X°=Y°) are aligned, instead, or two specifiers. This captures the observation that mixed structures do not linearize on the basis of Kayne's LCA. Rather, they require further stipulations to predict the linear order. Indeed, it is certainly possible to assume that these branching structures do not encode any mapping relations between syntax and linear order, but then, the linear order must be accounted for with independent motivations. In fact, one position in the linear order of (16) does not automatically imply a distinct position in the syntactic hierarchy. Consequently, in order to relate linear order and syntactic hierarchy in mixed structures, it is necessary to consider both c-command and precedence/subsequence as distinct factors. Thus, consistently Spec-Head-Compl and Compl-Head-Spec structures require less stipulations than mixed structures in order to put in relation linear order and syntactic hierarchy[14]. Graphically, it is possible to lengthen some branches of the tree in order to show that two given elements in the structure do not overlap. However, lengthening one branch does not count in X-bar theory. According to Generative Grammar there is no Branch Length Parameter available for the hearer to disambiguate the linear order of a structure as (16).

The impossibility to relate directly linear order and syntactic hierarchy in (16) also means that even in a simple language with only two projections and without any movement, the linear ordering is already ambiguous in its basic structure. In other words, the speaker of this hypothetical language cannot predict whether the word in fourth position represents a head X° or a head Y° and consequently is not able to recognize the phrase. At the same time, two specifiers may overlap thus leading to the same ambiguity. Crucially, ambiguity is "built in" in this structure. From the point of view of elaboration of the linguistic input, this causes a greater cognitive load for the hearer.

[14] A more radical view may be that resorting to further stipulations questions the validity of the tree structure itself. If further stipulations are necessary to derive the linear order, then branching is not an adequate tool. If branching is not adequate to account for linear order, then choosing a Spec-Compl-Head structure over Compl-Head-Spec or Spec-Head-Compl structures becomes irrelevant to the purpose of linearization.
Alternatively, if branching is not adequate, but we still maintain that Spec-Head-Compl tree structures are relevant for linearization, the whole results in a contradictory attempt to account for linear order by means of a branching structure that does not linearize.

Thus, only Spec-Head-Compl or Compl-Head-Spec are suitable structures to relate syntax to linear order. Among this two possible structures, Kayne then chooses the former **(Spec-Head-Compl)** as a universal because it allows to rule out some word orders which actually are never found in natural languages. There appears, thus, *one* direct relation between hierarchical structure (X-bar structure) and surface linearization:

> «X-bar theory is not a primitive component of UG [...] expresses a set of antisymmetric properties of phrase structure. This antisymmetry of phrase structure will be seen to be inherited, in effect, from the more basic antisymmetry of linear order.» (Kayne 1994: 3)

Since the linear order follows the temporal order, with strings of words/signs occurring along the time line, X-bar theory gets linked to the streaming of time, which is especially desirable if we consider that languages, too, are part of the tangible world which is constrained by laws of space and time. Of the two logically possible orders, Kayne chooses the binary left-branching *Spec-Head-Compl* as universal by claiming that the mapping relation instantiated by the LCA is more specifically a relation of *precedence* (instead of subsequence) and in doing so this unidirectionality of Universal Grammar turns out to be an instance of the unidirectional flow of time:

> «This S-H-C property of UG, as well as the fact that UG does not make both orders available, is thus seen to be ultimately related to the asymmetry of time.» (Kayne 1994: 38)

As a consequence, phrases are linked in one and the same order. Surface orders other than the only one directly available to UG must be derived through leftward movement of one or more constituents and can no longer be ascribed to parametrical variation of the branching structure. Crucially, this theory matches empirical observations on word order. For instance, some orders of adjectives, nouns and numerals are never attested crosslinguistically (see §2.2.2). In a framework where different deep structures are freely available, it would be difficult to relate the freedom of order at deep structure level with the restrictions on the order at surface level. Under Antisymmetry, the raising movement, which in

principle could be either leftward or rightward, can only be leftward (see the next section) because the higher nodes where material moves to are consistently to the left of the lower nodes from which the material raises.

1.2.4 Pied-piping

Since Kayne's antisymmetry affects the ordering of all projections, the different word orders observed within the DP of languages (e.g. adjectives, numerals, determiners) must all be related to one and the same underlying phrasal structure. Likewise, the different word orders observed in the IP projections of languages (adverbs, aspectual markers, negation) must be all linked to one and the same structure. This theoretical framework matches the observations of different authors. Greenberg (1963) notes that word order in languages is not entirely accidental but is constrained by some universal principles and tendencies. Baker (1985) also observes that the order of free morphemes and of bound morphemes is related by what he calls a "mirror principle". Sproat & Shih (1988) have suggested some constraints on the ordering of attributive adjectives in English and Mandarin. On the basis of analysis of the position of adverbs and grammatical affixes in different languages, Cinque (1999) proposed a universal hierarchy of functional projections within the IP domain. As for CP, Rizzi's theory, developed mainly on the basis of Italian data, relies on a Spec-Head-Compl structure.

As seen in §1.2.3, antisymmetry also states that the only option to generate linear orders different from the universal one made available by UG is leftward movement. Cinque (2000, 2005a) thus explicitly relies on a massive application of **pied-piping** to derive the various orderings of elements inside the DP such as determiners, numerals, and adjectives, starting from a fixed **Dem**onstrative > **Num**eral > **A**djective > **N**oun hierarchy. Pied-piping has been primarily related to wh-question inversion and occurs when the first element that raises also "drags" along other elements. Thus the fronted wh-element triggers the (leftward) movement of other elements. According to Cinque, the movement within DP can occur in different ways. First, it can involve only the raising of the NP. Alternatively, the (projection containing the) NP can raise and drag along the preceding element with a pied-piping that Cinque refers to as the "picture-of-who" type. Finally, the (projection containing the) NP can invert with the preceding element, before dragging it along, so as to produce a rolling-up effect that Cinque calls a "whose-picture" type of

pied-piping. This point will be illustrated using examples (17) to (19), which are taken from Cinque (2005a). The surface orders Dem-Num-A-N, Dem-A-N-Num, and N-A-Num-Dem are derived from one universal deep structure with one merge order of elements. In the following, I shall use Cinque's terminology to distinguish the two types of pied-piping.

17. Dem Num A N (no raising, no pied-piping: universal base ordering)

18. Dem A N Num (partial NP raising with *picture of who* pied-piping of A)

19. N A Num Dem (raising of NP with successive pied-pipings of the *whose picture* type)

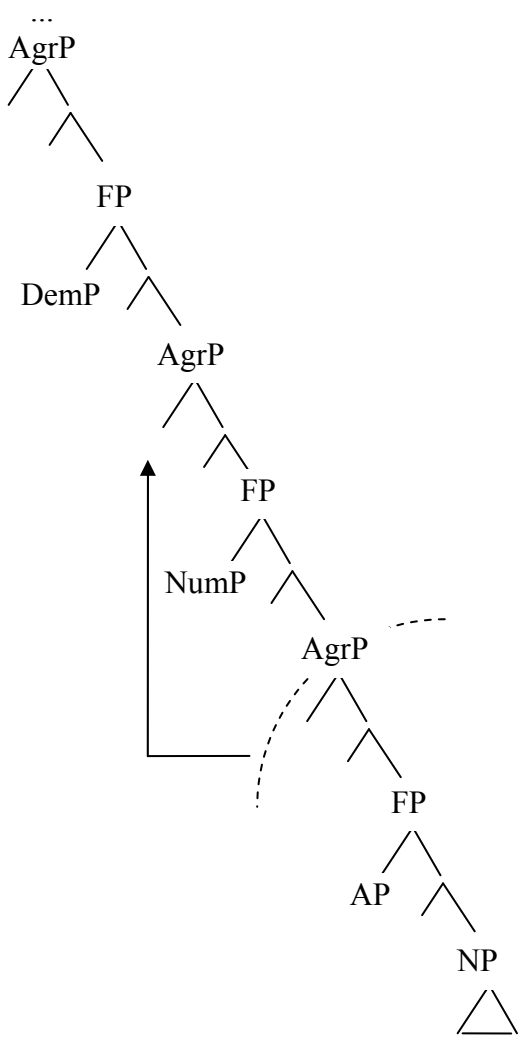
Cinque takes the order in (17) as the merge order. In other words, he assumes that the **Dem Num A N** surface order of (17) derives directly from the universal hierarchy of projections **DemP > NumP > AP > NP** when no movement occurs in the structure. Then he derives other orders by admitting that the NP first moves leftwards and possibly triggers the pied-piping of the first node dominating the moved element: a sequence of pied-pipings yields successive roll-up movements by which the elements may end up in (partially) reverse order. In this way, for instance, both the previous orders in (18) and (19) are derived from the merge order of (17).

In (18) the noun raises across Num dragging along also the Adjective *before* itself creating the order: **Dem [A N] Num** $t_{[A\text{-}N]}$. On the other hand, in (19) the noun moves across the adjective, then raises around the numeral dragging along the adjecive behind itself and finally moves across the demonstrative dragging along both adjective and numeral. First, the order **Dem Num [N] A** t_{N} is generated, subsequently the order **Dem [N A] Num** $t_{[N\text{-}A]}$ is produced, and finally **[N A Num] Dem** $t_{[N\text{-}A\text{-}NUM]}$ obtains. For the sake of simplicity, in each step, I have reported only the trace left by the group of lexical elements moved in that step.

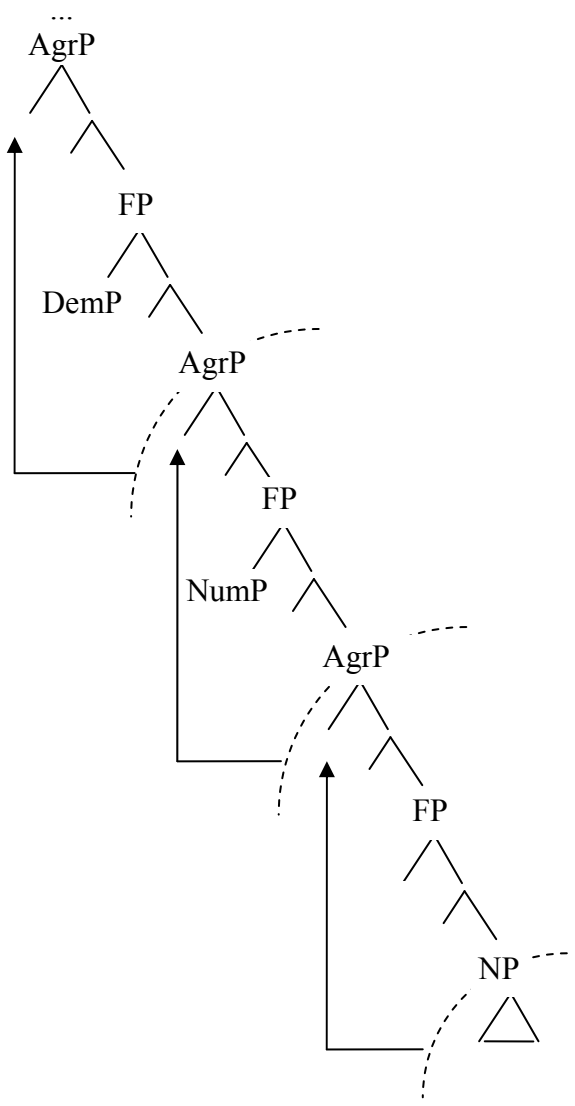
In Cinque's perspective, the movements are triggered by the need for the adjective(s), the numeral and the demonstrative to target different AGReement projections inside the DP, where they can undergo agreement with the nominal phrase. Indeed, agreement between noun, adjectives, numerals, and demonstratives is observed across different languages of the world. In Cinque's framework, also other noun-related phenomena,

like the presence of quantifiers, genitive, construct state and their different word orders can be accounted for, but here a basic structure will be exemplified. Accordingly, the derivations of (18) and (19) are represented in (20) and (21). In (20), an AgrP containing noun and adjective raises to the specifier of an AgrP located to the left of the NumP. In (21), the NP raises to the specifier of the first AgrP, located above the adjective. This AgrP then raises to the specifier of the AgrP above NumP. This latter raises to the specifier of an AgrP located above DemP.

20. Derivation of Dem A N Num (18)



21. Derivation of N A Num Dem (19)



Cinque also notes that the lower/higher degree of markedness of DP-related word orders matches the degree of markedness of other independent pied-piping phenomena. Pied-piping with inversion (of the

whose picture type) is generally less marked and also generates less marked ordering of elements in the DP. Looking at (21), one sees that "rolling-up" pied-pipings, that is *whose-picture* pied-pipings, result when a lower projection moves leftwards across a higher one, producing a first inversion, and then a yet higher projection (here AgrP) containing the two inverted elements, raises further up. *Picture-of-who* pied-pipings as in (20) occur when AgrP raises leftwards without previous inversion of the lower projections contained in it. Thus, in my view, in order to raise N-A across Num, two leftward movements are required, whereas raising A-N across Num requires only one leftward movement. From this point of view, the qualitative difference between *whose-picture* and *picture-of-who* pied-piping is a quantitative difference of leftward movements. In this light, it seems that the regular application of leftward movement (if any) is less marked than applying leftward movement intermittently. It is less costly to apply repeatedly one movement rule in a sequence (for instance, move N across A, move AgrP across Num, and so on…) than to "list" the projections which move and those which do not move (for instance, N does not move across A, but AgrP does move across Num; or the first AgrP does not move, but the second does…). As the different leftward movements can occur independently from each other, for example, AgrP may raise without previous movement of N, it appears that each leftward movement must be independently motivated. Subsequent leftward movements have also been suggested by Poletto & Pollock (2004) and Munaro & Pollock (2005) to give a unified account for wh-questions in spoken languages with wh-doubling, wh in-situ, and sentence-final wh. Poletto also provides an analysis of Zanuttini's (1997) data on negation compatible with antisymmetry. Different positions in the sentence seem to be involved in the process of negation and their ordering can be accounted for by subsequent leftward movements.

1.3 Methodology

As stated in the very first section of this chapter, this study intends to examine the differences between two sign languages, LIS and NGT, with respect to certain syntactic phenomena (antisymmetry, split CP/DP, and pied-piping). Firstly, the goal was to assess the amount of variation between the two sign languages and secondly to examine the possiblity of using frameworks developed for spoken languages in accounting for sign languages. In order to make the comparison between LIS and NGT, it

was necessary to obtain or collect data involving the target constructions. It was not possible to cover every aspect of the syntax of NGT and LIS; also, this was not the goal since this study will in general try to verify whether a general theoretical framework proposed on the basis of work on spoken languages can successfully be applied to sign languages, despite the modality differences (§1.4).

The data discussed in this dissertation come from databases collected by different authors as well as from my own work with informants. There were three informants for NGT, two female and one male. Two informants came from central Holland and one from the Groningen area, thus different regional variaties of NGT were involved. All three informants were born deaf and have a good knowledge of written Dutch. For LIS, two informants were predominantly used: a deaf man born to deaf parents, who therefore has acquired LIS as his first language, and a hearing woman born to deaf parents, who therefore had acquired both LIS and spoken Italian as her first languages. As already mentioned, additional data was taken from the literature. Although more informants would be needed to reach definitive conclusions, I think that the data presented here are sufficient to allow for a first comparison between the two languages.

The data elicited from informants were not elicited using pictures or films. For reasons of efficiency, I had to elicit data using written sentences while asking the subjects for a translation in their own sign language. The informants were then filmed producing the translations. On the basis of the film material, it was then possible to analyse the sentences in detail with respect to the manual and nonmanual components. In order to better differentiate the subtleties of meaning that might be conveyed by one sentence, I often discussed the recorded sentences with the informants after they had produced the translation. This was done in either NGT or LIS, although I am a not a native signer of either language. By using the respective sign language, my intention was to create a more natural situation.

In addition to the translation, I also explicitly asked the informants for grammaticality judgements, as is commonly done in research about spoken languages. For NGT I constructed sentences and then asked the informants whether these sentences were acceptable. For LIS I relied both on data I had collected in the past and on data provided in studies by other authors. Based on the previously collected data, I had also

constructed sentences in LIS and asked for grammaticality judgements. In the following, whenever no source is given for an example, this means that I have elicited the example from an informant myself. Grammaticality judgements have not been used in many research projects on sign languages, but certainly in some (e.g. van Gijn 2004). Signers, just like speakers, are able to give grammaticality judgements about their own native language. The use of other research data will increase the number of informants. Nevertheless, the results still have to be interpreted in the light of a relatively limited dataset. I also think that researchers who are native signers of the language under investigation could help very much in the analysis of sign languages because they have direct "instinctive" access to the subtleties of their own language and no specific elicitation tasks would be required.

Finally, certain conventions have been used for glossing the signed sentences. All sentences are glossed in English, except for examples from the literature that appear in a different language in the original source. Obviously, the same gloss for signs from two different sign languages does not necessarily imply that the two signs also have the same phonological form. Signs are glossed in SMALL CAPS and their location in space is indicated by subscripts (e.g. $\text{SIGN}_{\textbf{SUBSCRIPT}}$) when relevant for the analysis. For example, let us consider an NGT sentence glossed in English, as (22).

22. YESTERDAY STRANGE $\text{PERSON}_{\textbf{RGT}}$ $_{\textbf{RGT}}\text{COME}_{\textbf{1}}$ [NGT]
'Yesterday a strange person came to me'

The subscript is written to the right of the gloss when only one location is employed, that is, in the majority of cases. In (22), the noun PERSON is articulated on the right side of the signing space. With verbs and signs which move between two locations, the starting point is indicated on the left and the endpoint on the right of the gloss. As explained in §1.1.3, locations are important when they mark agreement between different parts of speech. They are symbolized as follows: "**1**" for 1st person, "**2**" for 2nd person, "**RGT/LFT**" for 3rd persons located to the left or the right of the signer, respectively. Thus, the verb COME in (22) moves from the right, the location introduced for PERSON, towards the signer. Locating a 3rd person sign in the space often depends on a free choice of the signer, only constrained by the condition that one and the same location be used consistently when different elements agree. In other words, the same

location must be shared by agreeing elements – for instance, when a noun and an adjective agree, when a verb agrees with its argument(s), or when a pronoun refers back to a noun previously signed. An English translation appears below the gloss. As mentioned in §1.1.2, nonmanual markers are glossed, when relevant, above the string of signs which they accompany during the utterance, and their spreading domain is indicated by an underscore as in the LIS example (23).

23. **top.**
PRESIDENT$_{\mathbf{RGT}}$ IX$_{\mathbf{1}}$ SEE$_{\mathbf{RGT}}$ NEVER [LIS]
'(As for) The President, I have never seen him'

Indexes such as IX in (23) are "pointing signs" which sometimes can be safely translated as pronouns or demonstratives, but in other cases do not have an overt counterpart in the translation because their function is more similar to that of agreement markers or clitics. They may also cover other functions, though having the same phonological form. They will be glossed as follows:

- IX = index whose exact status is not easily recognizable (it may be an agreement marker, a personal pronoun, or one of the followings) or is not relevant in the analysis
- NIX = nominal index, used to assign a location to those nouns which cannot be articulated in the desired location
- DIX = demonstrative, which usually serves also as 3rd person strong personal pronoun
- LIX = locative index
- PIX = possessive index

In (23), for instance, the general gloss IX is used. In contrast, in (24) the prenominal 1st person possessive index PIX$_1$ precedes the noun BROTHER and clearly occupies a position different from that of the nominal index NIX$_{\mathbf{LFT}}$ used to assign a location, which follows the noun.

24. [NGT]
YESTERDAY STRANGE PERSON$_{\mathbf{RGT}}$ PIX$_{\mathbf{1}}$ BROTHER NIX$_{\mathbf{LFT}}$ $_{\mathbf{RGT}}$GO$_{\mathbf{LFT}}$
'Yesterday a strange person went to my brother'

In example (24), the subject/agent of the verb is the 3rd person which was signed on the right ("a strange person") while the object of the verb is the referent which was signed on the left ("my brother"). It is thus clear, due to the movement of the verb, that "a strange person" went to "my brother" and not the other way around.

Other features which may convey important morphosyntactic information are set in superscripts (SIGN$^{\text{SUPERSCRIPT}}$) when necessary. This is often the case with aspectual marking on verbs which requires alterations of the movement of the base form. Finally, reduplication of a sign, when relevant for the analysis, is represented by '++' (SIGN++) and triplication by '+++' (SIGN+++).

In some examples, a literal translation is necessary to provide a clearer meaning of the glosses and the morphological markers (e.g. agreement markers) without altering the sign/word. In such cases, verbal agreement is consequently indicated on the verb as **1S**(ubject)/ **1O**(bject), **2S/2O,** or **3S**/**3O**; indications "**LEFT**" or "**RIGHT**" will be added only when necessary to disambiguate two different 3rd persons. Also note that, for the purpose of this dissertation, the label "object" will equally refer to direct objects (e.g. 'she saw/phoned *me*'), indirect objects (e.g. 'she spoke *to me*'), and locative objects (e.g. 'she came *to me*') unless a more detailed description is required by the context, in which case other specifications will be added. In some cases, additional information will be reported on a separate line, in italics.

1.4 Aims and contents of this book

As mentioned in §1.2, a considerable amount of research has been and still is devoted to trying to explain spoken language data in the light of antisymmetric structures. Rizzi (1997) proposed a split-CP hypothesis where CP is divided into different projections ordered in a Spec-Head-Compl structure. Likewise, Cinque (2005a) shows that the word orders related to DP can be derived from a split-DP divided in many projections again according to one Spec-Head-Compl structure. Cinque (1999) also suggests one hierarchical structure of (adverbial and aspectual) functional projections inside IP. In contrast, research on sign languages has often been based on the assumption that the deep structure may show different internal orders.

On the one hand, for instance, wh-questions in spoken languages with wh-in-situ, sentence-final-wh and wh-doubling have been discussed by Poletto & Pollock (2004) and Munaro & Pollock (2005). They have assumed that CP branches according to a Spec-Head-Compl structure (thus with all Specs on the left). On the other hand, analyses of ASL wh-questions have either assumed that [Spec;CP] is on the left (Petronio & Lillo-Martin 1997) or on the right (Neidle et al. 2000). Similarly, interrogative and relative clauses in LIS have been analyzed assuming that [Spec;CP] is on the right (Cecchetto, Zucchi & Geraci 2004), but Pfau's (2006a) analysis of NGT topicalizations and conditional clauses in terms of a split-CP with Spec-Head-Compl structure is also compatible with LIS topicalization and conditionals (Brunelli 2007). Bertone (2007) has derived the order of elements in the DP of LIS using the same account as Cinque (2005a) for the DP in spoken languages, whereas such order of elements is usually taken as part of evidence that LIS is head-final.

If we really take for granted that sign languages are natural languages, we are forced to assume firstly, that theories developed for spoken languages must hold also for sign languages. Therefore, secondly, it should be possible to account for all crosslinguistic variation among sign languages with one Spec-Head-Compl branching structure (as it is proposed for spoken languages) and with the same theoretical tools developed for spoken languages up to now. Conversely, new theoretical formulations which may emerge on the basis of data from sign languages should hold also for spoken languages, since we are dealing with universal structures. Sign languages may thus be important for the refinement, confirmation, or rejection of hypotheses which up to now have mostly been based on spoken languages.

The aim of this dissertation is then to evaluate to what extent antisymmetry, split-CP/DP and pied-piping can be used in describing sign languages and therefore to measure to what extent these notions can be applied to languages regardless of modality. In this dissertation, data from LIS and NGT will be compared in an attempt to account for this crosslinguistic variation in the light of such theories. The work will focus on DP and CP phenomena in these two sign languages as well as on negation, modals, and some aspectual markers. Verbal agreement is not dealt with here, but it will be exploited as a piece of evidence when discussing the position of modals and negations inside the IP.

The book is organized as follows. Chapter 2 will compare data on DPs (adjectives, possessives, numerals, and pluralization) of both LIS and NGT and then attempt to derive different orders from the same hierarchical structure by means of pied-piping, thereby extending to NGT Bertone's (2007) proposal for LIS. Chapter 3 will be devoted to the structure of the simple sentence with specific emphasis on negation. As mentioned above, verbal agreement, although presented briefly, will not be discussed because this would require more research than is possible within the scope of this study. In the context of negation, I will also take into consideration agreement and other phenomena such as aspectual marking and the position of some modals since in this way, the hierarchical IP structure of these two sign languages can be described and then compared to the one already proposed for spoken languages. The analysis will try to extend Cinque's (1999) universal hierarchy of functional heads within the IP domain to sign languages and will attempt to account for negative clauses by means of leftward movements.

Chapter 4 will then deal with some left periphery phenomena such as topicalizations and interrogative clauses. Imperatives will also be discussed. An analysis of LIS and NGT interrogative clauses (both yes/no and wh) will be attempted building on Brunelli's (2007) proposal for LIS, on Aboh, Pfau & Zeshan's (2005) and Aboh & Pfau's (2011) analysis of interrogative clauses in NGT and Indopakistani Sign Language, and on Poletto & Pollock's (2004) and Munaro & Pollock's (2005) unified account for wh-in-situ and sentence-initial-wh spoken languages.

Chapter 5 will analyze left periphery phenomena involving combinations of clauses (i.e. conditionals and relative clauses) building on Pfau's (2006a) proposal for NGT conditionals and Cinque's (2003, 2005b) unified account for both internally headed and externally headed relative clauses of spoken languages.

Each chapter contains a section where data from LIS and NGT are presented together for ease of comparison followed by an analysis section. Sometimes data from other languages, both signed and spoken, will be discussed in order to test the hypotheses more thoroughly.

The final chapter brings together the results and discusses the implications for the central issues of this study.