Antisymmetry and sign languages: a comparison between NGT and LIS

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Chapter 6. Conclusions and avenues for future research

This final chapter presents a summary and discussion of the conclusions drawn in this dissertation and of the remaining open questions. The applicability of the antisymmetric framework to the analysis of LIS and NGT is evalauted together with the need to motivate independently some projections required in antisymmetric derivations for purely theory-internal reasons.The findings with respect to crosslinguistic variation including also crossmodal variation are summarized. Some counterarguments to antisymmetry, are also briefly presented, mainly on the basis of evidence from LIS. In relation to this I also touch on the application of antisymmetry to some phenomena that were not discussed in the previous chapters, that is SOV order and verbal agreement. Finally, I shall revisit some general issues presented in chapter 1.

In this research, different aspects of LIS and NGT were compared. The areas investigated include the DP domain (order of adjectives, nouns, demonstratives, possessives, numerals), the IP domain (order of verb, aspectual markers, modals, and negation), and the CP domain (topicalization, conditionals, imperative, interrogative, and relative clauses). The aim of this research was twofold: first, to arrive at a comparative description of these two sign languages and second, to establish whether the crosslinguistic variation found among sign languages is constrained by the same language universals hypothesized for spoken languages. Thus, the dissertation aimed at indicating whether the crosslinguistic variation observed in LIS and NGT can be derived from the same order of merge, imposed by an antisymmetric universal deep structure à la Kayne (1994), consisting only of Specifier-Head-Complement branching phrases (see §1.2.3 and §1.4). Data from other sign languages and also from spoken languages were also discussed in the course of this comparison.

It has to be pointed out that the present research does not offer a comprehensive analysis of LIS nor of NGT. It should rather be seen as an attempt to determine whether it would be worth making a more thorough investigation of the applicability of antisymmetry to these sign languages. Nevertheless the the observations made about the attested crosslinguistic variation are valuable in themselves and will be summarized in §6.1. The discussion of the applicability of antisymmetry to LIS and NGT will be

presented in §6.2. In §6.3, I shall discuss the need to motivate the projections required by remnant movement. In §6.4, I will briefly present some counterarguments to an antisymmetric model for LIS (and NGT), along with some further speculations (which require future investigation). General conclusions are presented in §6.5.

6.1 Crosslinguistic variation within DP, CP, and IP

The DP domain (chapter 2) of LIS and NGT displays interesting crosslinguistic variation. Whereas LIS has a strictly postnominal sequence of elements, NGT shows more variation: some elements occur postnominally, others prenominally, and some elements may occur either pre- or postnominally. Thus, the DP-internal elements of LIS appear preferably in the sequence: **N – Poss – A – Num – Dem/Q** (although N-Num-A is also possible). In contrast in NGT, I have observed partial orders that can be summarized in the sequence: **Q/"Other"/Poss/Dem – (N-A-Num)/(Num-A-N) – Loc** (slashes separate elements for which I have not been able to determine a linear order or for which different, alternative orders exist). Apparently, there is no difference in meaning between pre- and postnominal numerals and adjectives in NGT. Postnominal LIS elements occur in the mirror order of prenominal NGT elements. Moreover, the NGT postnominal elements **A-Num** appear in an order which is the opposite of the **Num-A** order displayed when they are in prenominal position. Thus, the two sign languages show crosslinguistic variation comparable to that attested across spoken languages. For instance, English has the same prenominal order of elements (Dem – Num – A – N or Poss – Num – A – N) as NGT, while the analysis of the Standard Arabic DP (Cinque 2000) can be applied to the LIS postnominal order, as will be discussed later. The possibility of having alternative orders of elements within a single language, as observed in LIS and NGT, is attested also in other sign languages (e.g. Taiwanese Sign Language (Zhang 2007)) and, again, in spoken languages (see Cinque (2005a) and references therein).

The CP domain of these two sign languages, too, displays a certain crosslinguistic variation, along with some invariable properties (see chapters 4 and 5). Both the variation and the similarities concern partially the order of signs and partially the so-called grammatical nonmanual markers (NMMs), that is, dedicated facial expressions, body and head

postures which are associated with specific syntactic phenomena. Both LIS and NGT place topicalized elements in a left-peripheral position (i.e. preceding the rest of the sentence) and conditional clauses before the main clause. Also, both languages have an optional lexical conditional marker which appears at the beginning of the conditional clause. Topics bear a "raised eyebrows" NMM in both languages. Conditional clauses, too, have a NMM that consists of "raised eyebrows", although other NMMs are observed, especially the "tense eyes" NMM of LIS. Both languages mark imperative clauses nonmanually, rather than lexically, but in doing so, they employ partially different NMMs. Additionally, imperatives are also manually marked in that the movement of the hands is more tense than in plain declarative clauses.

Interrogative clauses display interesting properties, in that NGT, but not LIS, commonly employs a sentence-final lexical marker "palm up" (PU/Q-PART) which acts as a question particle and which may occur in both wh and polar questions (Aboh & Pfau 2011). In contrast, the two languages pattern with each other with respect to the position of the wh element which is usually clause-final in both languages, although some interrogative clauses with an in situ wh element are also attested. NGT occasionally allows for double-wh interrogative clauses, that is, clauses which contain two wh signs in distinct positions. In LIS, complex wh phrases can split, yielding a structure with the wh sign WHICH in clause-final position and the noun in situ. Interrogative NMMs behave similarly in the two languages, with "lowered eyebrows" marking wh questions and "raised eyebrows" marking yes/no and alternative content questions. In describing the data, it turned out that the "lowered eyebrows" wh NMM is comparable to the lexical general wh marker (G-WH) found in IPSL (Aboh, Pfau & Zeshan 2005) and different from the question marker Q-PART of NGT, which may occur in all types of interrogative clauses. Both LIS and NGT allow, to different extents, wh questions without overt wh phrases, thus patterning with Aboh, Pfau & Zeshan's (2005) and Aboh & Pfau's (2011) observations concerning IPSL and spoken languages, such as Oro Nao. Sign languages, thus, appear to have at their disposal different overt components for forming interrogative clauses: (possible) wh phrases, a nonmanual or lexical marker distinguishing wh from yes/no interrogative clauses, and a possible lexical question marker which encodes interrogativity. Again, the optional presence of three distinct markers is also observed in spoken

languages, crucially in some head-initial languages (see, for instance, Veneto varieties in Poletto & Pollock (2004) and Munaro & Pollock (2005)) where an interrogative-marked verb is sandwiched between a wh phrase and a higher wh element. This latter element can have a specific form or else it reduplicates the first wh element, as observed also in those sign languages that display wh doubling.

Relative clauses indicate even more intralinguistic variation within LIS. LIS has different relativization strategies at its disposal, as is also observed in certain spoken languages (see, for instance, de Vries (2002) and references therein). The order of signs suggest that it may be interesting to investigate whether NGT also has EHRCs. I would like however to reemphasize the point that the data collected for NGT relative clauses may have been influenced by the methodology: unlike LIS, NGT sentences were obtained only on the basis of asking informants for a Dutch-to-NGT translation and the resulting structures are identical to those found in Dutch. Thus, my analysis of restrictive relative clauses addresses only LIS. LIS makes use of both EHRCs and (circumnominal) internally-headed relative clauses (IHRCs). Moreover, LIS, but not NGT, also shows a special sign PE which has been analyzed as an emphatic demonstrative/determiner (Branchini 2006; Branchini & Donati 2009; Bertone 2007; Romeo 1997) which occurs not only in relative clauses, but also in nonrelative clauses. Combining the data reported by different authors, it turns out that PE can occur in both IHRCs and EHRCs and also in different positions within the clause. In addition to this, LIS relative clauses involve the layering of different NMMs, a restrictive "tense eyes" NMM and a topic "raised eyebrows" NMM that marks all topicalized elements. In contrast, in NGT, only the topic NMM is attested, as far as I have been able to observe. The data collected show that conditionals, too, have partially different NMMs, though the conditional subordinate clause appears always to the left of the the matrix clause in both languages. The LIS conditional clause has a topic NMM, a "tense eyes" NMM and "tense cheeks", just like relative clauses, plus a "forward head tilt". The NGT conditional clause is accompanied by the topic NMM plus "head forward", "head tilt", and "chin lift". That is, the LIS conditional NMM is very similar to the relative NMM. Also, some lexical conditional markers of both LIS and NGT share similarities with the LIS demonstrative PE, which can occur in relative constructions. This suggests that LIS and NGT treat conditional clauses as (subtypes of)

relative clauses – a possibility which awaits further investigation (see Bhatt & Pancheva 2005; Arsenijević 2009; Haegeman 2009a, 2009b).

Some differences appear also in the order of signs within the IP domain of the two sign languages (chapter 3). These differences are reminiscent of the crosslinguistic variation observed within DP. LIS IP elements, in particular aspectual and modal markers, have a strictly postverbal order whereas NGT shows a higher intralinguistic variation, with either pre- or postverbal modals, along with postverbal aspectual markers. Notice that in this dissertation only synthetically inflected verbs (so-called agreeing verbs and spatial verbs) have been considered in the analysis of IP. In addition to this, some aspectual markers (e.g. reduplication) incorporate[112] in the verb as movement-altering affixes, rather than as lexical elements. Consequently, they do not appear in any linear order. However, even though the data are partial, LIS clearly displays the orders **V – Asp$_{\text{celerative/durative}}$ – Asp$_{\text{perfect}}$** and, more generally, **V – Asp – Mod**. NGT shows the order **V – Asp$_{\text{celerative/durative}}$ – Asp$_{\text{perfect}}$** and both **V – Mod** and **Mod – V** orders. In both languages, agreement markers, crucially subject agreement, appear on the lexical verb, rather than on modals, aspectual markers, or tensed auxiliaries. Consequently, subject agreement appears in most cases to the left of other elements, given that the verb usually precedes them (apart from some Mod-V sequences in NGT). Negation in LIS is obligatorily lexical (manual) and accompanied by a nonmanual marker, whereas negation in NGT is only nonmanual. In LIS, negation is marked by the obligatory clause-final sign NOT and accompanied by a "headshake" NMM (Geraci 2005), whereas in NGT, it is marked only by the obligatory "headshake" NMM (Coerts 1992; Pfau & Bos 2008). Negative elements such as NOBODY, NOTHING, NOT-YET are attested in both languages and their distribution interacts with the spreading of NMMs. In LIS, the NMM spreads between the position of the negative sign and the end of the clause. Thus, when the negative element is final, the NMM occurs only with this element; when it is in situ, the NMM accompanies the last part of the sentence containing the negative element. The same phenomenon has been

[112] Recall that I use the words "incorporate" and "incorporation" to indicate that in the surface order of elements, an affix appears as an integral part of a sign, rather than occurring detached from it. I do not necessarily refer to the syntactic process that gives rise to this phenomenon.

observed in NGT sentences with in situ negative elements, although I have no examples of clause-final negative elements in this language.

In conclusion, although more descriptive work is necessary in order to allow for a more detailed comparison of these sign languages, the data presented are sufficient to prove that sign languages show as much crosslinguistic variation as spoken languages. It is important to mention that their use of space for morphosyntactic purposes, especially for verbal agreement, may be a possible counterexample to this claim. As pointed out in §1.1.3, §1.1.4 and §3.1.1, both LIS and NGT inflect some verbs synthetically by changing the start- and endpoint of their movement to make them match the locations previously assigned to the verbal arguments. Given that this is a widespread phenomenon across sign languages, it is tempting to conclude that no variation occurs in this domain, in contrast to the strikingly different inflectional systems attested across spoken languages. However, according to Marsaja (2008), there is at least one sign language, Kata Kolok, which has no synthetic inflection at all, that is, its verbs always retain their base form. Furthermore, some interesting crosslinguistic variation is observed even between LIS and NGT in the context of plain verbs. These lack synthetic inflection and the two languages resort to different analytic strategies (as described in §3.1.1). LIS makes use of indexical pronouns (possibly weak or clitic pronouns according to Bertone's (2007) classification). NGT can use the agreement auxiliary sign glossed as OP or ACT-ON (Bos 1994), the sole function of which is to take over the inflection prevented from attaching synthetically to the lexical verb. I have not been able to establish whether the NGT sign OP always acts as the counterpart of LIS clitic/weak indexes or whether there are also other strategies available in NGT. However, the fact remains that LIS has no OP-like auxiliary. In light of these patterns, it appears that some variants occur less often in sign languages, rather than being completely excluded. The alleged similarities between sign languages appear then to be even fewer than expected at first sight, thus providing some evidence against Meier's (2002) Variation Hypothesis.

6.2 Applicability of antisymmetry

This section summarizes the conclusions drawn in previous chapters with respect to the applicability of antisymmetry to the DP, IP, and CP domains of LIS and NGT.

The orders of signs observed within the DP of LIS and NGT are compatible with the universal Specifier-Head-Complement ordered deep structure and the universal merge order **Q–Dem–Num–A–N** proposed by Cinque (2000, 2005a, 2008b) in the spirit of Kayne's (1994) theory of antisymmetry. Cinque proposes that orders different from this universal merge order result from successive "rolling-up" movements which involve raising of the NP followed by remnant movements that successively pied-pipe lower constituents across higher ones, thus inverting the elements. First N moves across A, then N-A raises across Num (thus yielding N-A-Num), and so on. Cinque refers to these movements as pied-piping of the *whose picture* type. Partial orders derive if some raising does not occur (e.g. A-N-Num if only A-N moves across Num) or if the noun raises alone without subsequent pied-pipings (such as N-Num-A).

As already mentioned in §6.1, the order of LIS adjectives, numerals and demonstratives is the same as the the order discussed for Standard Arabic by Cinque (2000) and was derived in Bertone (2007) by means of a sequence of inverting pied-pipings. In addition to this, the data show that the position of LIS possessives is the same as in the construct-state of semitic languages. Then, the full derivation of the LIS DP-internal order of elements is obtained in chapter 2 by following step-by-step Cinque's (2000) derivation for semitic languages, based on pied-pipings. In contrast, the order of signs within the NGT DP can be accounted for by assuming a partial presence of pied-pipings which can raise the noun and the adjective to the left numerals; this operation is, however, optional. I have not been able to find out what motivates this optionality. The fact that alternative DP-internal orders have also been described for Taiwanese Sign Language and some spoken languages (as mentioned in §6.1) suggests that this optionality does not depend on specific properties of NGT nor on the visual modality. Moreover, although it may be surprising to have two different, apparently unmarked, orders within a single language, the possibility of having elements in either postnominal or prenominal position in the same language proves that a head-final

approach is not necessarily the most economic one. Such an approach may provide a straightforward account for postnominal elements, but it requires additional (remnant) movements to derive their prenominal positions. It is possible to claim that a head-final structure is to be preferred for orders (as in LIS) which are the mirror sequence of what is observed in head-initial languages (e.g. English) because such a deep structure would derive directly the surface order of elements without any (remnant) movements. This claim, however, requires the paradoxical assumption that, when a single language (e.g. NGT) displays two distinct orders of elements, it has two different deep structures (in fact opposite ones, if we think of the Num-A-N vs. N-A-Num orders in NGT). Thus, once remnant movement is proven to be necessary anyway and the organization of the deep structure is shown to depart in any case from the order of overt elements at the surface structure, there is no longer a need to reject an antisymmetric Specifier-Head-Complement structure. This structure has the additional advantage of being shared also by head-initial languages, thus being a good candidate for a Language Universal. The fact that quantifiers and some higher adjectives, such as OTHER, precede the noun in NGT indicates that raisings in this language stop at some point in the DP, as proposed by Cinque (2000) for the word order of Romance languages, for instance. At the same time, the fact that in NGT, a prenominal demonstrative index (which can be pluralized) may co-occur with an (invariable) postnominal locative index matches Bruge's (2002) proposal for Spanish. According to this hypothesis, the demonstrative and the locative are merged together and are then possibly split up by leftward movements of Dem and N. In contrast, the fact that all indexes are postnominal in LIS makes it difficult to distinguish the locative from the demonstrative. Still, the co-occurrence of reduplicated indexes on the dominant hand with an invariable index on the nondominant hand is compatible with the claim that pied-pipings in LIS apply more consistently and extensively than in NGT (see chapter 2), thus stranding not only the locative but also the demonstrative index in postnominal position.

The order of elements related to the IP domain proves to be compatible, in principle, with an antisymmetric phrase structure and a sequence of successive leftward "rolling-up" pied-pipings. Crucially, an analysis in terms of Specifier-Head-Complement structure and leftward movements is able to relate the order of IP elements in LIS and NGT to

another property of these sign languages: the attachment site of the subject agreement marker. Synthetically inflected verbs (e.g. agreeing verbs) bear person inflection, even when they are accompanied by aspectual and modal signs, so that these uninflected, postverbal markers also follow subject agreement. Also, in head-initial spoken languages, uninflected elements (e.g. infinitives or participles), which are generally taken to be lower than subject agreement in the structure, follow subject agreement in the linear order (e.g. they follow finite auxiliaries). In other words, the antisymmetric account allows the assumption that subject agreement in LIS and NGT is structurally high (and on the left) as in head initial languages. It relates the different surface order of elements to the distinct elements bearing subject agreement. Conversely, assuming a head-final deep structure would make it necessary to assume that subject agreement in these two sign languages is lower than in head-initial languages, such as English or Italian and, crucially, even lower than in Turkish (by Baker's (1985) Mirror Principle), which is classified as head-final.

LIS shows in the IP again a more rigid ordering than NGT. In fact, LIS markers and affixes display the mirror order of the merge order **Mod>…Asp$_{perf}$>…Asp$_{dur/celer(fast)}$>…V** proposed by Cinque (1999, 2006) and appear consistently postverbally, whereas NGT modals can appear either pre- or postverbally. Aspectual markers, in contrast, occur postverbally in both languages or, at best, appear on the verb (if they are movement-altering affixes). Notice that modals are higher than aspect markers in Cinque's hierarchy and this matches the previous claim that pied-pipings apply more extensively and consistently in LIS than in NGT, as argued in the case of DP. In fact, because of this different extent of pied-piping, lower elements are more easily affected by inversion in both languages, while higher elements are affected only or more often in LIS. Crucially, adverbs which quantify over events, such as 'always' (= all the times/cases), are consistently postverbal in LIS, but occur before the verb in NGT, thus behaving similarly to nominal quantifiers, such as 'all', which are consistently postnominal in LIS, but occur before the noun in NGT. This suggests that NGT pied-pipings stop at a certain level within IP, just as they do within DP. It also entails that such adverbs are quite high within IP as (nominal) quantifiers are high within DP.

The final position of negative elements in the two sign languages is derived through raising or merger of the negative element into

[Spec;NegP] as in Geraci (2005). Negative elements of both languages raise to [Spec;NegP], except for LIS NOT, which is merged there. In contrast to Geraci, however, it is assumed that the specifier is on the left and that raising is leftward and followed by remnant movement past the negation. The in situ position of negative elements is explained as a consequence of the fact that the negative element raises leftwards together with a number of surrounding elements, as proved by the presence of the negative NMM over a string of signs (rather than just on one sign). Thus, here it is assumed that movement is always overt, if raising of the negative element occurs. However, the negative element may be extracted alone or raise as part of a bigger chunk, along the lines of what has been proposed for wh raising in interrogative clauses on the basis of Aboh & Pfau's (2011) analysis (see chapter 4 and here below for the discussion of CP). Finally, the negative "headshake" NMM is assigned under spec-head agreement in [Spec;NegP], as in Geraci and similarly to what has been proposed for other NMMs, for example, for interrogative NMMs in Pfau (2006a). Thus, in both languages, the extension of the negative NMM directly reflects the extension of the chunk moved to [Spec;NegP] containing the negative element. If an element is merged in [Spec;NegP], the NMM spreads only across that element.

When in NGT no overt negative particle appears, that is, in simple negative sentences, the raising of some constituents is forced in order to fill NegP, so that the NMM spreads over a string of signs, again under spec-head agreement. For instance, if the verb and (additionally) the object raise to [Spec;NegP], the NGT negative NMM will spread across verb and object. In LIS, in contrast, the lexical negation NOT is merged directly in [Spec;NegP], hence the NMM is restricted to that sign and remnant movement of the whole clause occurs, stranding NOT clause-finally. No clear conclusion can be reached about the exact position of NegP in the structure. However, if NegP sits above IP, as proposed by Geraci (2005), the remnant movement may target FinP, or, alternatively, if NegP is within IP, the remnant movement may target TP or some aspectual or modal projection. In both cases, projections are involved which are independently assumed for a number of other languages. The facts about LIS negation also show that the surface order of signs in this language is the mirror order of the underlying **Neg… > Mod… > V.** In

fact, it is possible to observe the order V-Mod-Neg with some LIS modals.

In the light of this discussion, LIS leftward movements raise the verb before the modal and the complex verb-modal before the negation. However, the data show that LIS and NGT usually convey modal negation by means of specific negative signs which encode both modality and negation in one lexical form. It has been argued that these forms are not just a combination of negation with a (positive) modal, in that their semantic content is partially different from that of their positive counterparts. Negativity is a byproduct of their semantics and this semantics is related to distinct forms which are inserted in the lexicon as independent signs. This phenomenon is attested also across spoken languages. In contrast, when the positive form of the modal is negated without any additional semantics, that is, when there is just a combination of modal and negation, the standard negative constructions are used: LIS adds the lexical negation NOT and NGT adds simply the negative NMM. The two sign languages, however, have partially different inventories of negative modal signs and this shows, again, that sign languages display more crosslinguistic variation than may be expected at first sight (see §6.1).

The CP domain of both languages presents some instances of leftward movement and Specifier-Head-Complement structure, as well as some cases of (apparent) rightward movement and head-final or specifier-final structure. Clear evidence of leftward movement are topicalized constituents, which appear in the left periphery of the sentence, and conditional subordinate clauses, which again occur to the left of the matrix clause and may also contain an optional lexical marker introducing the subordinate. Conditional lexical markers are clause-initial and support thus the view of a Spec-Head-Compl structure. Data also show that in LIS EHRCs the head noun occurs to the left of the relative clause, thus behaving like DGS relative constructions (see Branchini et al. 2007). Moreover, in LIS EHRCs, a sign PE (analyzed as a demonstrative) can occur at the beginning of the relative clause. In contrast, the clause-final position of wh elements in both LIS and NGT, along with the clause-final position of the NGT interrogative marker Q-PART appear to be instances of a head-final deep structure where righward movement occurs. Also, the clause-final position of the sign PE in IHRCs of LIS (analyzed here as circumnominal, based on Branchini & Donati's (2009)

view that they are internally-headed, but not correlative) supports this hypothesis. Indeed, LIS wh interrogative clauses and PE-clauses have long been treated as evidence of a head-final structure. However, Aboh & Pfau (2011) and Aboh, Pfau & Zeshan (2005) have shown that the sentence-final question marker Q-PART of NGT and the wh lexical marker G-WH of IPSL pattern similarly to sentence-final question markers and interrogative tonemes attested in some spoken languages (e.g. Oro Nao, Gungbe). They have provided an analysis of yes/no and wh interrogative clauses in terms of leftward movement which raises (part of) the clause across these particles stranding them clause-finally.

Following Aboh & Pfau's (2011) observation that wh phrases are independent from interrogative marking and my own observation (§4.1.3 and §4.2.3) that interrogative marking is also different from wh lexical or nonmanual marking, it is suggested that wh elements, interrogative markers, and wh or yes/no markers instantiate three distinct projections which can all be overtly filled at the same time in some Romance languages, generally considered to be head-initial and to have a Specifier-Head-Complement structure (Poletto & Pollock 2004). This is an extension to NGT of an idea originally proposed for LIS in Brunelli (2007, 2009). Data from these languages suggest that the hierarchy of these projections is **WhP > InterP > FocP**, where the higher WhP hosts disjunctive operators (Munaro & Pollock 2005), the second projection hosts interrogative markers or interrogatively-marked verbs, and FocP hosts wh phrases. The order of elements and the distribution of lexical and nonmanual markers of IPSL, LIS and NGT is derived by three successive leftward movements motivated by the need to check three distinct features. An intermediate projection, generally labelled TopP, is assumed to sit between InterP and FocP (along the lines of Aboh & Pfau (2011) and similar to Poletto & Pollock (2004)). The distribution and the function of the "raised eyebrows" NMM and "lowered/furrowed eyebrows" NMM also suggest that these encode Munaro & Pollock's (2005) disjunctive operator hosted in the highest wh projection. The "raised eyebrows" NMM signals finite disjunction, entailed in yes/no and alternate wh questions. The "lowered eyebrows" NMM signals infinite disjunction involved in the formation of open wh questions. The fact that wh signs, such as WHO or WHAT, may optionally occur in situ (that is, in first position if they are subjects and in preverbal position if they are objects) is accounted for following Aboh & Pfau's (2011) proposal that

such elements can either raise alone to FocP and be crossed by remnant movement or do not raise at all (or, alternatively, they raise as part of a bigger constituent).

Taking into consideration LIS complex wh phrases (e.g. WHICH BOOK) which can be split, the derivation of the distribution of elements is further refined with three distinct types of raising: wh element raising alone, raising together with a noun, or not raising at all (alternatively, raising with a yet bigger constituent). If the wh element raises alone and leaves the head in situ, the wh-phrase splits. If the wh and its noun raise together, the whole wh-phrase ends up in clause-final position. In all other situations, the whole wh-phrase occurs in situ.

As for the relative clauses, the vast majority of relative clauses of LIS and NGT are derivable under Cinque's (2003, 2008a) unified account, which assumes two head nouns and a CP structure with Spec-Head-Compl projections and three complementizers. Interestingly, the distribution of PE in LIS (at the beginning of EHRCs, final or in situ in IHRCs) can be treated along the lines of the distribution of wh elements, that is, with PE raising alone, raising with the internal head, or not raising at all (alternatively, raising with a yet bigger chunk). Some few cases remain unexplained, but may involve additional complexities, as, for instance, possibly bi-clausal structures or clitic subject indexes that occupy a different position than other subjects, thus distorting the order of elements.

In this light, Cinque's (2003, 2008) hierarchy of three CPs is reminiscent of the structure proposed in chapter 4 for interrogative (wh or polar) clauses. Throughout the analysis, yet another parallelism appears, that is, the LIS sign PE is independent from the restrictive relative marker, just as wh elements have been shown to be independent from lexical and nonmanual wh markers in interrogative clauses. This, far from being evidence for leftward movement, shows that an antisymmetric approach makes it necessary to take into consideration a finer syntactic structure of functional projections which ultimately must reflect a more subtle hierarchy of logical derivational steps. In this low-level sequence of operations, it is possible to highlight intriguing parallelisms between different constructions and syntactic domains of the language.

The similarities between relative constructions and interrogative constructions appear in the same syntactic domain (both phenomena have to do with the CP), while other parallelisms appear in distinct domains,

such as the similar orders of elements within DP and IP, for instance. Thus, assuming a more articulated structure for these two domains reveals that, in both of them, there are elements which are ordered hierarchically higher and which are less consistently affected by rolling-up pied-pipings, and lower elements which are more easily affected. In my opinion, from this point of view, antisymmetry is also a useful tool to delve into the essence of categories such as NP and VP, given that differences can be determined more easily once the similarities have been observed.

6.3 Motivating the projections

Apart from testing the compatibility of antisymmetry with the different sign orders of LIS anf NGT, it would also be attractive to find some independent evidence, or at least some clues, for the existence of projections that thus far have been imposed by purely theory-internal requirements. In fact, on the one hand, antisymmetry maintains that every single instance of (apparent) rightward movement results from at least two successive leftward movements associated with distinct projections. In other words, under antisymmetry, additional projections are necessary to explain (apparent) rightward movement. On the other hand, however, a proliferation of unmotivated projections must be avoided. Motivating independently the projections required by the leftward-movement analysis lends additional support to the analysis itself. As seen in §6.2 and chapters 4 and 5, a number of distinct projections within the CP domain of LIS and NGT is supported on the basis of analogy with the distribution of lexical elements in head-initial spoken languages. Support comes also from semantic aspects, given the fact that disjunction, interrogativity, definiteness, and identification of a head noun are independent factors which must co-operate in the formation of interrogative or relative clauses. Thus, for instance, Poletto & Pollock (2004) and Munaro & Pollock (2005) provide independent evidence for the existence of additional projections in interrogative clauses of head-initial spoken languages, while Aboh, Pfau & Zeshan (2005) and Aboh & Pfau (2011) reach similar conclusions on the basis of sign languages (see §6.2). Also, on the basis of the need to give prominence to the element to which interrogativity applies in polar and wh questions and to the element to which identification applies in relative constructions, it seems

reasonable to assume a FocP (or ContrP) inside the CP domain. In this respect, it is striking that all the cases of apparent rightward movement in the left periphery of LIS and NGT seem to reduce to instances of one phenomenon, namely focalization or contrast as argued in §5.2.3 and §5.3, a fact which, in my opinion, does not provide sufficient motivation for the assumption of a head-final structure for the whole CP domain. In conclusion, although the exact number and type of projections required for interrogative and relative clauses must still be determined, there are convincing clues that these projections can be independently motivated.

As for the IP domain, the main reason to assume a Specifier-Head-Complement structure with leftward movements is the position of agreement on the verb, especially subject agreement, which linearly precedes modals and aspectual markers, as it does in a number of other languages classified as head-initial. The argument is thus based on a crosslinguistic and cross-modal generalization, in that the leftward movement approach captures a parallelism between LIS and NGT, on the one hand, and head-initial spoken languages, on the other (although this parallelism concerns an abstract phenomenon, the position and the nature of subject agreement). In this light, the only difference between these languages lies in the element on which agreement inflection appears in LIS and NGT, that is, the lexical verb. Another argument of generalization supports the adoption of a Specifier-Head-Complement structure for IP. Assuming leftward movement to [Spec;XP] in the IP domain provides a uniform theory, adopting a mechanism parallel to the one proposed for the CP domain, which in turn shows similarities with theories proposed for spoken languages with Spec-Head-Compl structures. For instance, negative constructions are derived assuming that negative NMMs are assigned under spec-head agreement in a specifier within the IP domain, just as wh interrogative NMMs are assigned in a specifier within the CP domain and correspond to functional elements attested in languages with Spec-Head-Compl structure.

However, future research is necessary to find further evidence for leftward movement in IP, in order to further motivate these assumptions. Notice also, that in this dissertation I have neither discussed the position of the object in the structure nor the exact structural position of subject agreement, which is notoriously difficult to determine. The proposal made here is based only on the **relative position** of subject agreement with respect to aspectual and modal markers. In negation, the landing site

for remnant movement has not been determined, yet, but it can reasonably be a TP, AspP or FinP (§3.2.4), that is, projections generally assumed for a number of other languages for independent reasons.

Finally, in case of the DP domain, I have only been able to verify the compatibility of the sign order(s) of LIS and NGT with antisymmetry and pied-piping. In Cinque's view, the inverting pied-piping movements should target some agreement projections (AgrPs), but, as he himself points out, it does not make much sense to postulate projections specific for agreement (see §3.3 on verbal agreement; the same conclusions hold for agreement in general.). Agreement, in fact, is a general phenomenon induced by spec-head relation in a maximal projection, regardless of the type of projection. Consequently, it can occur everywhere within the syntactic structure. It is not itself a feature encoded in a specific projection. Actually, some instances of agreement between DP-internal elements are observed in LIS and NGT. For instance, in §2.1.3 a plural demonstrative has been shown to agree overtly with a plural-marked noun (for NGT, see also Vink (2004); for LIS, see Pizzuto & Corazza (1996) and Bertone (2007)). Bertone (2007) discusses also number agreement (and, to a lesser extent, gender agreement) between noun and adjective in LIS in relation to Cinque's AgrPs. She also describes some instances of location agreement between noun and adjective. However, I have not investigated whether the instances of agreement observed within the DPs of LIS and NGT can safely be taken as evidence for the existence of all the AgrPs hypothesized by Cinque. Nor have I investigated how they can be put in relation to the different extent of the leftward movements hypothesized in this dissertation. Future research will hopefully identify specific features associated with those DP-internal intermediate projections, which so far have remained unexplained. I have also not considered classifiers, which should be taken into account for a complete analysis, since they are widely used in sign languages. Moreover, I have not analyzed the relative order of different adjectives (Scott's (2002) hierarchy).

At the moment, there appears to be only one convincing reason for noun raising. Following Bertone (2007), it is possible to assume that raising to [Spec;DP] is motivated by the need to fill the projection which is responsble for referentiality (Longobardi 1994) and/or case (Giusti 2005), given that LIS and NGT do not have articles which spell out D°. Apart from this, one argument of generalization can be offered as a clue

in favour of an antisymmetric approach to the DP of LIS and NGT. This is the observation made above that a Specifier-Head-Complement structure of their DP could highlight interesting parallelisms between the distribution of DP elements and IP elements in both sign languages, together with the observation that a Specifier-Head-Complement structure for their IP domain in turn relates the position of their subject agreement to that of head-initial spoken languages. In addition to this, consider that the advantage of an antisymmetric model is also that it predicts the impossibility of some orders, such as, for instance, ***A-Num-N** or ***Loc-N-Dem**, which are in fact neither attested in LIS nor in NGT. Also the fact that in one and the same language, NGT, some elements can be either post- or prenominal and modals can be either post- or preverbal suggests that the postverbal and postnominal positions of elements may not automatically be related to a head-final structure and that some movement has to be assumed anyway. This last observation does not per se motivate (the projections required by) leftward movement and antisymmetry. Rather, it shows that, although the surface order of LIS and NGT signs is often the opposite of the order observed in head-initial spoken languages (and sign languages), this does not automatically imply that the LIS and NGT deep structure is head-final.

6.4 Some counterarguments to antisymmetry

As has often be stated (e.g. in §1.2.3 and §1.4), one of the aims of this dissertation was to investigate whether, in principle, the antisymmetric model with leftward remnant movement(s) is applicable to LIS and NGT and to show the possible advantages and consequences of applying this model. The previous section has discussed some open questions concerning the motivation of projections in an antisymmetric deep structure of LIS and NGT. This discussion leads to the conclusion that an antisymmetric account is plausible. However, a number of counterarguments to antisymmetry have been made by Cecchetto, Geraci & Zucchi (2009) with respect to LIS, although most of their arguments can also be applied to NGT. Here I shall address these counterarguments and take the opportunity to make some further speculations. The first counterargument problematizes the "massive application" of pied-piping in sign languages, the second is based on the spreading of wh NMMs across parts of distinct constituents, and the third deals with

contradictions arising in the analysis of sentences that combine negative quantifiers and wh elements.

According to Cecchetto et al. (2004b, 2009), under leftward remnant movement, it is not possible to account for wh NMM spreading across parts of different constituents in (271), because this sentence would be analyzed as (272). According to them, under leftward remnant movement, SAY and WHO, over which the wh NMM occurs, «do not form a constituent and there is no obvious way to group them» (Cecchetto et al. 2009:292).

271. [LIS: Cecchetto et al. 2009:292]

wh.

PAOLO ARRIVE AFTER SAY WHO

'Who said that Paolo arrived later on?'

272. [LIS: Cecchetto et al. 2009:292]

[PAOLO ARRIVE AFTER $t_{\textbf{who}}$ SAY] $_{\textbf{REMNANT}}$ [WHO $t_{\textbf{remnant}}$]

Brunelli (2007, 2009) noticed that the wh interrogative NMM in (271) spreads correctly over the direct question, that is, the interrogative matrix clause SAY WHO, leaving out the subordinate clause, which is not interrogative (see also §4.2.5). The interrogative clause is analyzed in the light of Poletto & Pollock's (2004) structure with two wh projections and drawing on Aboh, Pfau & Zeshan (2005), along lines similar to the present dissertation. The fact that the subordinate clause appears to the left of the interrogative matrix clause is probably related to independent properties of LIS, since subordinate clauses to the left of the matrix clause are observed also in affirmative sentences as shown by Cecchetto et al. (2009). For instance, the sentence (273.a) is an alternative realization of (273.b). Crucially, in (273.a), the subordinate [MARIA CAKE EAT] is positioned to the left of the matrix clause.

273.

a. MARIA CAKE EAT GIANNI SAY [LIS: Cecchetto et al. 2009: 292]

b. GIANNI SAY MARIA CAKE EAT [LIS: Cecchetto et al. 2009: 292]
'Gianni said that Maria ate a cake'

However, Cecchetto et al's (2009) analysis, if I understand it correctly, does not account for this left position of the subordinate clauses (unless one assumes a split-CP, which sometimes branches leftwards and sometimes rightwards). Examples (273.a) and (273.b) are also related to the observation that, although LIS and NGT objects appear between verb and subject in SOV[113] order, subordinate complement clauses do not. This distribution may suggest that subordinate clauses are merged to the left of the verb of the matrix clause, just like objects, and must move to some position to its right, that is, to the end of the matrix clause. Cecchetto et al. (2009) do indeed derive (273.b) assuming that the subordinate clause moves rightwards. However, the order **matr.clause – sub.clause** (with non overt complementizer) is attested also in head-initial languages, for instance, English, hence it is not necessarily an argument against antisymmetry. Also, the position of LIS complementizers, such as REASON, which has developed into a functional sign acting like BECAUSE, reveals the same order **matr.clause – CP element – sub.clause** attested with causal subordinate clauses in head-initial languages (Brunelli 2009). This suggests that the mechanisms at work in LIS (and arguably NGT, given the clause-initial position of the complementizer OMDAT 'because') are likely to be the same as in languages with Specifier-Head-Complement structure. A similar phenomenon is attested in DGS, where the noun REASON «has developed into a complementizer introducing cause complements» (Pfau & Steinbach 2007:309). In LIS the sign fulfils also the function of WHY, much like its Italian counterpart *perché* ('why/because').

Turning back to subordinate clauses, these can thus be taken to be merged as objects to the right of the matrix verb in LIS, as it is assumed for their counterparts in head-initial languages. That is, (273.b) would reflect the postverbal merger of subordinate complement clauses in LIS. The same can also be assumed to occur in NGT . Clearly, if one takes this view, consistent with antisymmetry, the object NP must also be assumed to originate postverbally in these sign languages. In other words, the underlying order of these languages would be SVO and their surface order SOV is derived. It is not the subordinate clause that moves rightwards, then, but it is the object that undergoes some leftward movement, which must be motivated. As pointed out earlier in this

[113] However, recall that also the SVO is observed (see chapter 3).

section, I am not discussing the position of subjects and objects in this dissertation, but I can tentatively suggest here that object NPs move leftwards for reasons related to case or agreement, much like subjects do. After all, in LIS and NGT, agreement between verb and object is available and used frequently, even though only a subset of verbs shows overt agreement. Subjects, which are able to agree with the verb, precede the verb in LIS and NGT as in Italian or English. Along similar lines, it can be argued that LIS and NGT objects, which are able to trigger agreement on the verb, also come to precede it[114]. Clauses, in contrast, do not agree with the verb and can thus remain in situ, that is, in postverbal position as shown in (273.b). However, if they move, they raise leftwards as in (273.a).

From this perspective, it is not necessary to assume that movement sometimes proceeds leftwards as in (273.a) and sometimes rightwards as in (273.b); movement, if it occurs, is always leftwards. Both nouns and subordinate clauses move then leftwards, but target distinct positions, as the data show. In particular, nominal objects come to be between subject and verb, while object complement clauses target a position before the subject. The derivations are similar, though not identical: **SOV*t*$_{o}$ ≈ SubSV*t*$_{sub}$**. This difference may appear to be unmotivated. Yet, nouns and clauses probably target distinct projections because their movements are driven by distinct features. For instance, nouns may agree in case, number or ϕ-features, whereas clauses are CPs and may thus have some "CP features" to check. The fact that distinct features are involved in the two processes also accounts for the different types of movement observed: while there is a strong tendency in LIS and NGT to move the object NP to a position preceding the verb, the movement of an object CP seems to apply less frequently or, that is, it appears less obligatory.

A further counterargument brought forward by Cecchetto et al. (2009) is that under a remnant movement analysis, combining interrogativity and negation (e.g. constructing a question with a negative quantifier) implies the extraction of the wh or negative element from a specifier island and requires two unspecified projections «whose only purpose is to get the word order right» (2009:317). In other words, this counterargument questions the functioning of antisymmetry across the IP and the CP

[114] This raises some questions about the fact that other sign language, like e.g. ASL, have agreement, but SVO order.

domain. It also relies on the claim that some projections are not motivated. In considering the use of antisymmetry, this dissertation discusses distinct domains of LIS and NGT structure separately, so that the problems arising from the combination of different domains must be analyzed in future research. Moreover, even though I have usually assumed an SOV order at a certain point in the derivation (that is, in FinP/IP) for the partial derivations proposed, a thorough analysis of the whole derivation of the sign order of these languages can neither abstract away from the exact structural positions of subjects and objects (which I have not discussed) nor from the exact location of NegP (which I have left for debate). For instance, if NegP were within IP, lower than the position of the subject, the remnant movements which strand the negative element(s) clause-finally would not involve the raising of the subject. This would then be available for wh extraction. Apart from this, Cecchetto et al.'s (2009:317) discussion of remnant movement relies on the assumption that the OV order is already present at the very bottom of the structure, that is, within VP: [$_{\text{NEG}}$ [$_{\text{IP}}$ WHO [$_{\text{VP}}$ [NOTHING SIGN]]]. In other words, the analysis attempts to challenge the applicability of leftward movement(s) starting from a head-final structure.

It is relevant here to note that Neidle et al. (2000:147) also refute an antisymmetric account of ASL wh questions because it requires two unexplained projections: deriving ASL wh interrogative clauses from an antisymmetric structure «requires postulating additional functional projections and movements that are apparently otherwise unmotivated», while «projections are postulated only if motivated» (Neidle et al. 2000:147). The issue of motivating the projection was discussed fully in §6.2 and §6.3 (as well as chapter 4, which is concerned with wh questions). It is also relevant that the leftward movements necessary for wh interrogative inversion in LIS and NGT involve not more projections, but rather fewer, than those posited by Poletto & Pollock (2004) and Munaro & Pollock (2005) on the basis of evidence from spoken languages. The leftward movement required for negative inversion may target FinP (if NegP is above IP as in Geraci (2005)) or TP/AspP (if NegP is lower). In both cases, the assumed landing sites are projections generally assumed for a number of other languages for independent reasons.

At this point, though leaving much work for future investigation, we can turn to another argument from Cecchetto et al. When assuming that

right-peripheral positions of elements result from leftward (remnant) movements, a reason must indeed be provided for why remnant movement should apply so massively in sign languages, when compared to spoken languages. In light of what has been said in previous chapters, the massive use of "rolling-up" pied-piping is related to the following properties of LIS and NGT:

A. At least the raising of some material to [Spec;DP] is possibly related to the absence of articles that realize the DP projection lexically;
B. Movement to WhP is related to the presence of NMM, occasionally accompanied by lexical material in some languages;
C. The movement of the object may depend on agreement (spatial affix that can be incorporated into the verb and noun);
D. The order of verb, aspectual and modal markers within IP appears to be related to a different distribution of inflectional morphemes (subject agreement spatial affixes), in turn related to a reduced use of auxiliaries (such as 'have' and 'be').

Taken together, these facts suggest that the higher frequency of pied-pipings in LIS and NGT may be related to an increased lack of functional signs, in comparison to spoken languages. This absence of functional signs is balanced by leftward movement of other lexical material. In fact, it is no new observation that sign languages often lack overt articles and prepositions, substitute case and/or prepositional marking of complements by object-verb agreement, and often realize adverbs by means of NMMs. In this light, claiming an antisymmetric structure for LIS and NGT does not amount to denying their specific features related to the visual modality, but simply implies that the specificities of the visual modality affect a part of the grammar different from the branching organization of the deep structure. Instead of assuming that specific properties of the visual-modality reflect or imply a deep structure different from that of (head-initial) spoken languages, it is possible to claim that the specificity of the visual modality induces a different use of the same structure (which is universal). This difference could be related to reasons of economy and might have to do with the fact that both sign languages and spoken languages are part of this world, where laws of space-time apply. The fact that sign languages use space-time in a

different way than spoken languages do would make that economy yields different outcomes in the two modalities.

Both sign languages and spoken languages place their elements in linear order, for instance, arranging morphemes along the temporal dimension (e.g. the LIS/NGT perfective marker DONE follows the verb). However, the fact that sign languages can also exploit spatial resources means that they can also rely on devices that are independent from the time axis and thus have no effect on temporal ordering. These elements being time-independent, their affixation to a sign does not require time in the sense that it does not take additional time to pronunce them, that is, it does not necessarily lengthen the duration of the sign or the sentence. The availability of time-independent elements allows for the simultaneous encoding of different pieces of grammatical information. For instance, the referential system of many sign languages is based on spatial coordinates. Thus, it conveys important features on the spatial axes, that is, simultaneously to the root of the sign, without affecting the time axis. These referential features play an important role in verb-subject agreement and verb-object agreement, so that the spatial affixes ultimately surrogate the functions of different case-endings and prepositions. The same features are also used in pronominalization and for agreement between some nouns and adjectives, which in spoken languages may rely on gender or class suffixes. These spatial affixes are then **full** affixes with regard to functional content, but **null** affixes with regard to the time load. Thus, their use is more economic than adding a functional item, as small as it may be. Nonmanual markers, too, are time-independent because they are suprasegmental and can be superimposed onto strings of signs.

Spoken languages, in contrast, though making use of vocal intonation, apparently do not have at their disposal a comparable number of time-independent functional elements. Therefore, they must resort to lexical functional elements which extend only on the temporal dimension and may be affected by a number of prosodic phenomena (which I do not discuss here) and phonological reduction. In fact, the size of these elements corresponds to their temporal length. For instance, these elements cannot be short (as for the time to pronunce them), but “large” (in some other aspect). When phonological reduction applies, the time required to spell out a lexical element is reduced. This implies that reducing the (only) dimension of these elements voids (or, at best,

weakens) also their only source of grammatical information because there is less material left to spell out their grammatical contribution. Relying only on the time axis, spoken languages must constantly balance between time-consuming elements which express the relevant information and zero elements, which carry no information. Spoken languages are thus in continuous need of lexical functional material, while sign languages are driven by economy principles pushing them toward a broader use of nonlexical functional elements which, as argued above, is in turn related to the movement and pied-piping of some other material in order to spell out the features of the relevant functional projections.

6.5 General conclusions

Apart from some general observations about antisymmetry and the visual modality presented in chapter 1 and in §6.4, the ordering of DP elements, IP elements, and CP elements shows a considerable crosslinguistic variation, but is largely compatible with observations made for spoken languages. It also seems compatible on the whole with an antisymmetric model. In conclusion, the leftward movements hypothesized in CP are supported by the need to encode specific features, which also exist in other languages; the movements invoked for IP are supported above all by theoretical, crosslinguistic and crossmodal generalizations (the position of subject agreement in the surface and deep structure of LIS and NGT is the same as in head-initial languages) and by distributional properties of LIS and NGT lexical and nonmanual markers; the discussion about DP deals simply with the possibility of deriving the sign orders of these languages "mechanically" from an antisymmetric structure, without providing much independent evidence for the factors triggering these movements. When discussing the DP, I have also left out the classifiers, which are widely used in sign languages, and I have not investigated the possibility of a hierarchical relative order of adjectives (Scott 2002). In the discussion of the IP, I have left open the question of the exact nature of verbal movements (all XP movements as in Cinque or also some head-movements?). It is also necessary to verify whether available alternative orders of some LIS and NGT signs within DP and IP are indeed fully equivalent or whether they are possibly motivated by subtle interpretive differences that have not yet been discovered. Alternatively, the preference for a certain order might also depend on the

local variety of the language. This also illustrates the need to collect data from a larger group of informants, both in the case of LIS and in that of NGT. Despite these facts, the plausibility of an antisymmetric deep structure underlying LIS and NGT has been demonstrated, in my opinion, at least when phenomena within a single domain are considered. It is worth undertaking a more detailed antisymmetric analysis of these languages, especially focusing on phenomena occurring across distinct domains. However, as mentioned in chapter 1, I think that in order to delve into all the open questions concerning these languages and to verify whether antisymmetry is really able to account for all of their properties, it is desirable to involve LIS and NGT native-signer researchers who are able to recognize the subtleties of their own sign languages directly.