Comparative Correlatives
in Italian Sign Language[*]

Carlo Geraci

Department of Psychology
Univerità degli Studi Milano-Bicocca
Piazza dell'Ateneo Nuovo, 1
20126 – Milano, Italy
carlo.geraci@unimib.it

ABSTRACT. *Comparative correlative constructions (the more you run, the more you sweat) are widespread across the languages of the world (Taylor, 2006). Nonetheless, the peculiarities of this construction raise questions that challenge our understanding of the syntax of this specific construction and, more broadly, of how the core and the periphery of Universal Grammar (UG) are organized (Culicover and Jackendoff, 1999). To date, no study has investigated the comparative correlative construction in any sign language. The purpose of the present paper is to fill this gap and provide a survey of the main characteristics of comparative correlatives in Italian Sign Language (LIS).*

KEY WORDS: *comparative correlative, Italian Sign Language (LIS), subordination, island constraints in Sign Language.*

1. Introduction

Despite the fact that comparative correlatives (henceforth CCs), exemplified by English (1a) and Italian Sign Language LIS (1b-c), are widespread across the languages of the world (Taylor, 2006 and Leung, 2003), only a few studies investigate their characteristics in detail (Culicover and Jackendoff, 1999, and Den Dikken, 2005, to mention two of the most detailed).

(1) a. The more you run, the more you sweat

 b. GIANNI RUN-reduplication, SWEAT-reduplication[1]

 c. GIANNI RUN-reduplication, SWEAT MORE

Nonetheless, the peculiarities of CCs raise questions that challenge our understanding of the syntax of this specific construction and, more broadly, of how the core and the periphery of UG are organized (Culicover and Jackendoff, 1999). In particular, one of the most intriguing aspects is the *status* of the two clauses of the construction. From a semantic standpoint, CCs are interpreted as involving subordination of the first clause to the second (Beck, 1997). Thus, the first clause in (1a), *the more you run*, is interpreted as subordinate to the second one, *the more you sweat*. The overall interpretation is similar to that of an *if*-clause (*if you run more, you sweat more*). On the other hand, as pointed out by Culicover and Jackendoff (1999), there is evidence against syntactic subordination of the first clause to the second. The relevant examples from Culicover and Jackendoff are provided in (2):

---

1. Throughout the rest of the paper, the standard convention of using uppercase words for signs will be used. Additional information about the signs are indicated by words in lowercase, separated by a hyphen. Further information about the glosses will be provided when required.

(2) a. Which problem do you think that the sooner you solve *t*, the quicker you'll be able to tell the folks up at corporate headquarters to buzz off?

b. ?? Which folks up at corporate headquarters do you think that the sooner you solve this problem, the quicker you'll be able to tell *t* to buzz off?

Both the examples in (2) involve *wh*-extraction from a CC. The fronted *wh*-phrase in (2b), *which folks up at corporate headquarters*, is extracted from the second clause of the CC; while in (2a), the *wh*-phrase *which problem* is extracted from the first one. If CCs involve syntactic subordination of the first clause to the second (as suggested by their semantics), island effects are expected to rule out sentences like (2a) as ungrammatical (see also section 5). From the grammaticality of examples like (2a), Culicover and Jackendoff conclude that CCs involve subordination at the semantic level and coordination at the syntactic one, instantiating a case of mismatch between the syntactic and the semantic component of the language faculty.[2]

To date, no study has investigated the comparative correlative construction in any sign language. The purpose of this paper is to fill this gap, providing a survey of the main characteristics of comparative correlatives in Italian Sign Language (LIS), two instances of which are given in (1b,c). As we will see, most of the properties observed in LIS are also found in spoken languages. Although data come from one sign language only, the fact that a set of properties is shared across modality (spoken vs. signed) is of importance for the debate raised about CCs, and this puts the construction in the core part of UG. In particular, the facts

---

2. Den Dikken (2005) and Taylor (2006) argue against Culicover and Jackendoff's claim providing data of CCs from Dutch and German. Although, Den Dikken (2005) and Taylor (2006) convincingly explain why sentences like (2) in the text are possible in English, they do not show the asymmetric pattern expected under the hypothesis that the first clause of a CC is left-adjoined to the second. This sort of data is available in LIS and will be presented in section 4 and discussed in section 5.

concerning *wh*-extraction in CCs in LIS will show that these sentences are genuine cases of syntactic subordination.

The paper is organized as follows: In the second section, methodological issues about data collection are discussed. Section three is devoted to presentation of some of the main syntactic properties of LIS, providing the background against which CCs are to be analyzed. In section four, the properties of the comparative correlative construction in LIS are considered and compared with their analogue in spoken languages. We will see that LIS signers use two variants of the construction to express the meaning of a CCs. One is symmetrical (1b), and shows some structural similarities with the general structure found in many spoken language CCs (like English, and Italian). However, the syntactic and morphological properties of the CC in LIS will also constitute evidence that this construction is not the result of influence from spoken Italian. The other variant is asymmetrical (1c), but typologically attested in the realm of spoken languages, as well.

In section five, an analysis within the generative framework will be provided. The main proposal is to treat CCs as genuine correlative constructions involving subordination of the first clause to the second, as has been proposed for spoken languages (Den Dikken, 2005 and Taylor, 2006). Section six concludes the paper and sketches the lines for future research.

2. Methodology

The data in this study are from Deaf native signers (Deaf people with Deaf parents) of LIS who regularly collaborate with the research group at the Università degli Studi di Milano-Bicocca. Also a non-native, but very fluent signer was consulted, and his judgments were the same as the native signers' judgments (as had happened with previous studies by our research group). Although data from him are not included in the video collection of this paper, his comments were extremely precious to this work. All the informants have an excellent knowledge of Italian as a

second language. In particular, the selection of data included in section 4 come from two native signers, an MA student and a BA student.

Two facts make the methodology of data collection particularly challenging, even by the usual standard for sign language research. The first is that CCs have never been studied in any sign language, as mentioned in the introduction. The second is that in spoken languages (and presumably in sign languages, too), CCs are not exactly a frequent construction, compared to other semantically similar construction such as *if*-clauses. For these reasons a quantitative study based on naturalistic data, although potentially interesting, wouldn't offer enough material to allow a reliable description, at least at this preliminary stage and in the absence of a comprehensive LIS corpus. Thus, the data in this study come mainly from direct elicitation.

At the very early stage of this research, data collection was constructed in a simple way: the informants signed what they thought was the most natural way to express in LIS the meanings of some elementary Italian CC sentences proposed to them. Once it was clear that a consistent pattern emerged across speakers , more complicated examples were elicited by manipulating the lexical components of the simple examples and their structure, without resorting to translations from Italian. Incidentally, resorting to Italian would have been impossible since, in many cases, Italian counterparts were ungrammatical or highly marked.

LIS was the only form of communication used during data collection (the author of this paper is a CODA, a child of Deaf adults) A representative selection of the videos coupled with Italian glosses were shown to groups of native LIS signers in various public meetings, including the audience of the 3rd national conference on Italian Sign Language organized by the national Deaf association. The audience in these meetings generally accepted the LIS sentences as grammatical and deemed the matching between videos and Italian translations adequate. Thus, although the judgments reported in this study were originally elicited from few signers, there is evidence which suggests that the main facts hold for the community of native signers of LIS more generally.

One of the main concerns with eliciting data from minority languages is the risk that the the dominant language could influence data collection, as correctly pointed out by one anonymous reviewer. The risk is real, but we can address this issue. First, native signers consulted for this study have been members of a research group on LIS for a long time, and they have linguistic training and a strong Deaf identity. They know that the research is on the variety of LIS used by fluent signers within their community, and not on a contact variety. Furthermore, the reader will easily see from the data in section 4 that CCs in LIS have numerous properties (e.g. morphological processes, word order facts etc.) that are either totally absent or completely different from CCs in Italian (see in particular the discussion in section 4.2 and footnotes 3 and 17). Had Italian influenced data collection, a similarity between CC in Italian and CC in LIS ought to have arisen, contrary to what we report.

All the relevant data are available in QuickTime format glossed with SignStream, a software specifically developed for sign language research by the Boston University, (Neidle, Sclaroff, & Athitsos, 2001) at the following URL: http://www.filosofia.unimi.it/~zucchi/ricerca.html

3. Main syntactic properties of LIS

In this section, some macroscopic data about the syntax of LIS are provided. Of course, this is not an attempt to offer a comprehensive grammar of LIS, which is far beyond the scope of this paper. The facts presented here will serve as general background against which the data on CC in LIS are to be analyzed. Of particular interest here is the surface order between the verb (and auxiliary-like elements) and its arguments, the position of *wh*-phrases in direct questions, the strategy of relativization, and the position of the subordinate clause in LIS. Each of these topics is addressed in turn.

3.1. *Word order*

In simple declarative sentences, the verb tends to follow both the subject and the direct object, instantiating a surface SOV order, as shown in (3):

(3) GIANNI MARIA LOVE

   "Gianni loves Maria"

This is considered the unmarked order in spontaneous conversations among native signers of LIS, although the SVO order is sometimes used (Volterra et al. 1987, Pizzuto et al, 1990, Geraci, 2004, and Cecchetto, Geraci and Zucchi, 2006).[3]

Lexical elements that plausibly sit in the functional categories in the clausal domain (such as modals and aspectual markers) occur post-verbally, as illustrated in (4a-b):

(4) a. GIANNI METER 80 JUMP CAN

   "Gianni can jump 1.80 mt."

   b. GIANNI HOUSE BUY DONE

   "Gianni bought a house"

---

3. As highlighted in the previous literature (see Volterra et al, 1987, and Pizzuto et al, 1990, and references quoted there), the order of elements in simple declarative sentences in LIS seems to be influenced by a variety of semantic and morphosyntactic features, such as the reversibility of the predicate and spatial agreement (but see also Geraci, 2002). However, as the reader will see, the verbs in the examples of CCs in section 4 are all used in their intransitive form, for independent reasons. This eliminates all at once a possible source of contamination from the dominant language.

Negation in LIS is also found after the verb, as in (5) (see Geraci 2006a,b for a theoretical analysis of negation in LIS). Interestingly, negative quantifiers also occur post-verbally, as illustrated in (6):

(5) a. GIANNI MARIA LOVE NOT

"Gianni doesn't love Maria"

(6) a. GIANNI SIGN NOTHING

"Gianni didn't sign anything"

b. CONTRACT SIGN NOBODY

"Nobody signed the contract"

To sum up, DONE, negation and modals all occur after the lexical verb, and this suggests that the functional projections that host them are located to the right side of the VP. Furthermore, the right periphery of the LIS sentence is also the target for dislocation of *wh*-phrases: interrogative pronouns like WHAT, WHO, WHICH all appear in postverbal position (as shown in 7-8) and crucially follow the aspectual marker DONE, negation, and modals, as shown in (9):

(7) a. GIANNI BUY WHAT

b. What did Gianni buy?

(8) a. HOUSE BUY WHO

b. Who bought a house?

(9) a. CAKE EAT NEG WHO

"Who did not eat the cake?"

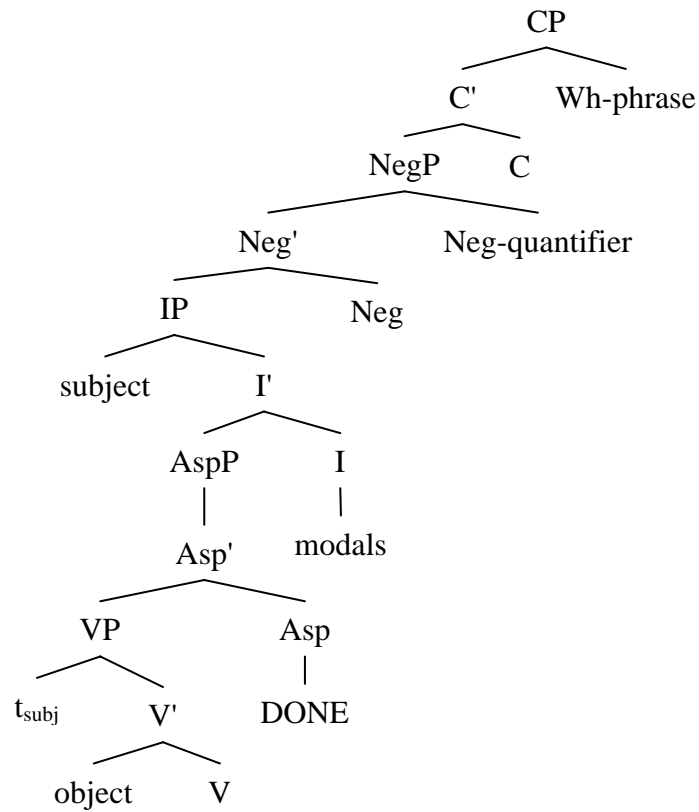b. GIANNI SEE DONE WHO

"Who did Gianni see?"

Since the position of *wh*-phrases is crucial for the analysis that I will present in section 4, it is worth presenting here a clear description of the structure of *wh*-questions. Contrary to what happens to *wh*-questions in spoken languages, where the dislocation of *wh*-phrases target the left periphery of the clause, dislocation of *wh*-phrases targets the right periphery of the sentence in LIS. In the generative framework, these sorts of dislocations are captured through the operation of syntactic movement. In the case of the *wh*-elements in (7-9), the result of this operation is that a syntactic element that should appear in the canonical argument position is actually found in a different position. So the direct object instantiated by the *wh*-element WHAT in (7a) is not in preverbal position, as it is in (3), but has moved to the right periphery of the sentence. Something partially similar happens to the *wh*-element in the English equivalent in (7b): it does not occupy the canonical post-verbal position, but is placed in a specific position in the left periphery of the sentence which is defined as the specifier position of the Complementizer Phrase (Spec,CP). Thus, I follow Cecchetto, Geraci and Zucchi (forthcoming) and place *wh*-phrases in a Spec,CP position located on the right branch (see also Neidle et al. 2000, for a similar analysis of *wh*-phrase displacement in American Sign Language, ASL). I also follow Geraci, (2006a,b), who by analogy to rightward movement of the *wh*-phrase, proposes that the specifier of the Negative Phrase is also right branching.

Putting all these pieces together, LIS can be considered a head final language, at least in the clausal domain, because the verb follows the object and the functional heads that host the aspectual marker, negation and modals follow the verb.[4]

A tentative skeleton of the structure of the LIS sentence is given in (10).

---

4. See, however, Geraci (2006a,b) for arguments that manual negation is located in the specifier of NegP.

(10) **Structure assumed for LIS**

```
                                    CP
                                   /  \
                                  C'    Wh-phrase
                                 /  \
                              NegP    C
                             /    \
                          Neg'     Neg-quantifier
                         /    \
                       IP      Neg
                      /  \
                subject    I'
                          /  \
                       AspP    I
                        |      |
                      Asp'    modals
                     /    \
                   VP      Asp
                  /  \      |
              t_subj  V'    DONE
                     /  \
                 object   V
```

3.2. *Relativization Strategies*

Let's now turn to the strategy of relativization in LIS. Recently, Cecchetto et al. (2006) proposed that LIS does not have relative clauses of the standard kind found in English and Italian, namely an NP modified by a clausal adjunct, as shown in (11); instead, a correlative structure is used by LIS signers, as a functional equivalent of the English sentences in (11), as sketched in (12):

(11) a. a [NP boy [CP that called]] left

b. Mary saw a [NP boy [CP that called]]

(12) a. [IP [CP BOY CALL PE] LEAVE DONE]

b. [IP [CP BOY CALL PE] MARY (HIM) SEE DONE]

A typical characteristic of this construction is the presence of a specific sign, glossed as PE,[5] whose function resembles that of a relative pronoun. Under the analysis provided in Cecchetto et al. (2006), the correlative pronoun PE appears at the right periphery of the first clause.

The sign PE is a unique element in the pronominal system of LIS in that it does not involve direct pointing toward a location of the signing space. Rather it involves spatial agreement with the position in the space where the nominal antecedent is articulated. Thus, in (13a) PE is articulated in the same location as the sign for FOX (as indicated by the subscript indices). The spatial agreement signals that FOX and PE refer to the same entity. Also the verb HIDE spatially agrees with FOX/PE, indicating that as its subject.

(13) a. [FOX$_i$ HARE STRANGLE DONE PE$_i$] [HIDE$_i$]

b. The fox that strangled the hare hid

On the other hand, in (14a) PE is construed with HARE, the direct object of the verb STRANGLED, but spatial agreement also indicates that HARE is the subject of the second verb.

---

5. The original name for the sign here glossed as PE in Cecchetto et al. (2006) was ProREL (which retained more clearly its grammatical function of a relative pronoun). However, the gloss adopted here, i.e. PE, reflects the way Deaf people "vocalize" this sign. To my knowledge this gloss was first used in Branchini and Donati (in press),

(14) a. [FOX HARE$_i$ STRANGLED DONE PE$_i$] [HIDE$_i$]

　　　 b. The hare that the fox strangled hid

Thus, spatial agreement vehicles the distinction between a correlative construed with either the subject or the object of the first verb, and no word order variation is observed.

Another characteristic that must be mentioned here is the fact that the "PE clause," namely the sentence containing the sign PE, must precede the matrix clause. In the analysis of PE constructions as correlative, this fact is automatically captured, since correlatives involve left adjunction of the subordinate CP to the matrix CP.[6] More recently, two other proposals have been offered for PE constructions, one by Branchini and Donati (in press), the other by Brunelli (2007). Detailed scrutiny of these other proposals is beyond the scope of this paper. However, what all these proposals have in common is the fact that PE constructions involve two separate entities: one is the so called "PE clause"; the other is the main clause. The overall structure, details aside, is given in (15):

(15) **Structure of the PE clause**
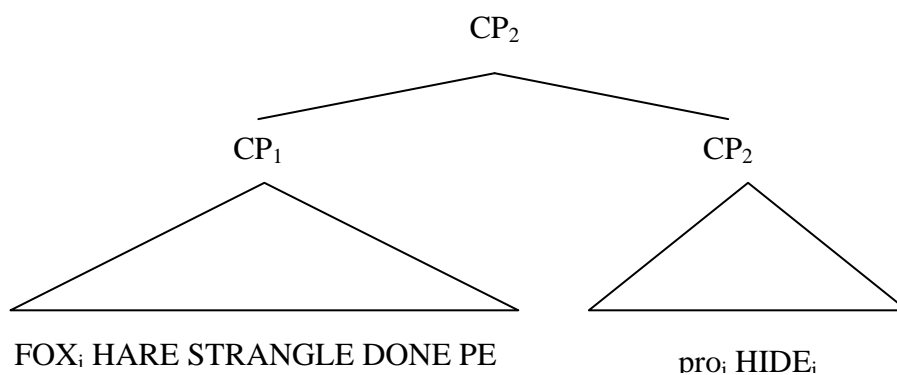
6. In the original proposal, Cecchetto et al. (2006) actually provide a structure where the subordinate CP is left-adjoined to the IP node of the matrix sentence. At present there is nothing that weighs against an analysis in which the subordinate CP is left adjoined to the CP node of the matrix clause, as illustrated in the text.

3.3. *Clausal Complement and Subordination*

Although there is no systematic analysis of clausal complements and subordination in LIS, some interesting data must be mentioned. Despite the fact that LIS is an SOV language, when the direct object of the verb is clausal, the complement never surfaces in its canonical argument position, but is either fronted or appears sentence-finally, as shown in (16):

(16) a. MARIA ARRIVE GIANNI SAY

   b. GIANNI SAY MARIA ARRIVE

   "Gianni said that Maria arrived"

   c. * GIANNNI MARIA ARRIVE SAY

A hypothesis about the pattern in (16) has been offered in Cecchetto et al. (2006), who try to correlate the reduced short-term memory shown by signers with the banning of center embedding in LIS and more generally in signed languages.[7]

As for subordinate sentences, an interesting fact emerges when *if*-clauses are considered.

Standard *if*-clauses are produced with a specific non-manual marking (NMM, indicated by a line above the glosses) that spreads over the *if*-

---

7. The hypothesis in Cecchetto et al (2006) is based on the fact that signs are particularly hard to recall in short-term memory serial recall tasks, resulting in a reduced short-term memory capacity for signs as compared to words (see Geraci et al, to appear, and Gozzi et al. 2007 for recent experimental evidence with LIS material). Center embedding would produce syntactic structures where an embedded clause is inserted between the subject and the verb of the main clause. This word order would produce a sequence of Noun Noun Verb Verb, as in (16c) in the text. Under this configuration, the first nominal element (the subject of the main clause) has to be retained in the memory buffer of the addressee until the final sign (the main verb) is articulated by the signer, overloading the addressee's short-term memory. The dislocation of the complement clause either at the beginning or at the end of the main clause (as in (16a-b) in the text) is a strategy available in the language to reduce the short-term memory load.

clause only: roughly raised eyebrows (see also Franchi, 1987) . A manual sign, equivalent to the English functional word *if* is optional, as shown in (17) (data from Barattieri, 2006):

(17) 　　　　 $\overline{\qquad\text{re}}$
　　　　a. RAIN UMBRELLA TAKE

　　　　 $\overline{\qquad\quad\text{re}}$
　　　b. IF RAIN UMBRELLA TAKE

　　　"if it rains, I will take the umbrella"

In spoken languages either the order antecedent-consequent or consequent-antecedent is possible, as in (18). Barattieri (2006) reported that LIS signers consistently produce the antecedent-consequent order and only some informants sporadically admit the reverse order, as in (19). The diacritics # indicates that the sentence is grammatical, but only for some signers. However, on closer examination, it emerges that the order consequent-antecedent, although rare (16 cases out of 154 sentences, Barattieri, 2006), is found only when the manual sign for IF (or one of its variants) is present; no cases where the antecedent follows its consequent are marked by NMM only.

(18) a. if it rains, I will take the umbrella

　　　b. I will take the umbrella, if it rains.

(19) UMBRELLA TAKE, IF RAIN

Further research is needed to fully evaluate the consequences of these facts. However one may speculate that there is a specific position in the left periphery of the sentence, associated with wide spreading of the relevant NMM that marks subordination, whose relevant feature seems to be the raised position of the eyebrows (the gloss "re" indicates raised

eyebrows). This speculation is supported when other cases of subordination are considered. Barattieri (2006) reported that in other subordinate constructions either the order in either (20a,b) or (21) is possible.

                  _____re

(20) a. RAIN OUT, IX-1p GO SUPERMARKET SAME

      b. ALSO RAIN, GO SAME SUPERMARKET

      "Although now it is raining, I will go to the supermarket as well"

(21) IX-1p GO SUPERMARKET, ALSO RAIN[8]

      "Although now it is raining, I will go to the supermarket as well"

In this construction, the "although" clause can be marked either by a manual sign glossed as ALSO, as in (20a), or by a distinctive non-manual expression (raised eyebrows) as in (20b). However, as in the case of *if*-clauses, when the order main-subordinate is found, the subordinate clause cannot be marked non-manually, but requires the lexical item ALSO, as illustrated in (21).

To conclude, complement clauses can either precede or follow the main clause, while it seems that other subordinate clauses that are marked only by NMM cannot follow the main clause. To capture this fact, I assume the structure in (22), where the subordinate clause is left-adjoined to the matrix clause. In this configuration, spreading of the relevant non-manual marking throughout the subordinate clause occurs.

---

8. The gloss IX-1p indicates the 1st person singular pronoun realized as a pointing toward the signer.

(22) **Macroscopic Structure for Non-Complement Subordinate Clauses in LIS**

$$CP_2$$

CP$_1$ CP$_2$

Subordinate clause   Main clause

With this picture in mind, let's now turn to the comparative correlatives in LIS.

4. CC in LIS

Given the syntactic differences between LIS and spoken Italian, there is frequently no direct equivalent in LIS for a particular Italian construction. Thus in attempting to translate from Italian, signers frequently offer more than one paraphrase in their attempt to convey in LIS the meaning from the Italian sentence. Indeed, we have two options in LIS, reported under (23a,b) that the informants produced as the counterpart of the Italian comparative correlative in (23c). The English translation is reported in (23d):

(_____)_____es   _____es

(_____)_____re   _____re

(23) a. GIANNI RUN-reduplication, SWEAT-reduplication

(_____)_____re

_____nmm

b. GIANNI   RUN-reduplication, SWEAT MORE

c. Più Gianni corre, più suda

d. The more Gianni runs, the more he sweats

This section investigates the properties of these two variants of CCs.

4.1. *Symmetric and non-symmetric CCs*

As it is evident from the glosses provided in (23a-b), both options display reduplication of the verb in the first clause (henceforth CP_1) of the construction. The two variants differ in that the verb of the second clause (henceforth CP_2) is reduplicated only in (23a), whereas the sign equivalent to the English *more* (Italian PIÙ) appears post-verbally in (23b). Another crucial difference is the distribution of the non-manual markers. While in (23a) the NMM equally spreads through the construction, in (23b) it occurs only on CP_1.[9] Finally, both CP_1 and CP_2 of (23a) are possible in isolation (although with some different nuances that require further investigation),[10] while CP_2, but not CP_1 of (23b) is possible in isolation. For these reasons, I will refer to the variant in (23a) as the symmetric variant (or version), and to the one in (23b) as the asymmetric variant of CCs in LIS.

9. As the reader can see from the video glossed with the SignStream software, in (23b) two distinct non-manual markers occur in CP_1: raised eyebrows co-occur both with the subject and the verb, while eye squinting co-occurs with the verb only (indicated by the notation es). On the other hand, raised eyebrows and eye squinting spreads over the same domain in (23a). At present, I have no account to offer for this difference.

10. When produced in isolation, the meaning is that of an iterated action, probably induced by reduplicative morphology. When the same sentence occurs as a clause of a CC, it seems to require also an increasing of some sort in the action (intensity, quantity etc.), it is not the simple iteration of the event. Still, whether this is the result of a different contribution of the non-manual elements or a semantic implicature generated by the combination of the two clauses of a CC is not clear.

The first question that comes to mind when two variants are found in a linguistic system is whether there is any systematic difference or preference in the use of one over the other within or across signers. This sort of question requires the investigation of a large sample of signers and situations, which is far beyond the scope of this paper. However, from a preliminary survey of the informants consulted for this study, those who produced the asymmetric variant first also allow the symmetric one. In contrast, signers who produced the symmetric variant first prefer not to use the asymmetric variant, although they understand it.[11] It is worth noticing that both variants are crucially different from the Italian counterpart in (23c) in that no reduplication is found in Italian. Moreover, in the case of (23b) the sign glossed as MORE in CP_2 in (23b) does not appear in the preverbal position as in Italian, but occurs in post-verbal position. As we will see in section 5, this is perfectly coherent with the structure for LIS proposed in section 3. Further evidence that the asymmetric variant is genuinely part of LIS will be provided in the next section.

Before turning to the main properties of CCs in LIS, something more needs to be said about the two variants, in particular with respect to their typological plausibility. At first glance, we can see that CCs exhibit a symmetric pattern also in Italian (*più* …, *più* …) and in English (*the more* …, *the more* …). Thus, the symmetric variant in (23a) has a direct correspondent in spoken languages, although realized in a different way. What seems to be typologically more problematic is the asymmetric variant in (23b). However, the way CCs are realized in Japanese is quite similar to the one in (23b), as shown in (24), and provides a suggestive and impressive analogy: the verb is reduplicated in CP_1, but not in CP_2, where an optional marker of quantity is inserted.

---

11. The reader who will look at the videos with the SignStream software will notice that the informant who regularly produce the symmetric CC, does not use the same sign for MORE as the informant who produces the asymmetric variant. This is due to idiolectal variation among speakers.

(24) **hashir**e-ba **hashir**u-hodo,Gianni-wa (youku) taberu[12]

　　　run-ba   run-degree, Gianni-NOM (a lot) eat

　　　The more Gianni runs, the more he eats

4.2. *The properties of CCs in LIS*

One of the characteristics that are found cross-linguistically in CCs is that, despite their symmetric structure, the two clauses are not reversible: if relative order of CP_1 and CP_2 is reversed, the meaning is not preserved (i.e. 25a does not mean the same thing as 25b):

(25) a. the more John runs, the more he sweats

　　　b. the more John sweats, the more he runs[13]

The relation of causality that is involved in (25a) is reversed in (25b). Namely, while the quantity (or the quality) of John's running somehow determines his sweating in (25a), it is the quantity (or possibly the quality) of John's sweating that determines his running, in (25b). This seems to be a peculiar property of CCs that distinguishes them from standard *if*-clauses, which are very similar in meaning to CCs (see Beck, 1997), but where the inversion of the two clauses is meaning preserving, as in (26):

(26) a. if John runs more, he sweats more

　　　b. John sweats more, if he runs more

---

12. Many thanks are due to Michiko Kaneko and Akiko Naka, who helped me with the Japanese data.
13. The sentence in (25b) may sound awkward, but the reader will not have a hard time to imagine funny scenarios that make it plausible.

Crucially, the pattern of asymmetry in causality of (25) is found with both variants of LIS CCs, as indicated by the contrast in (27)-(28):

(27) a. GIANNI RUN-reduplication, SWEAT-reduplication

b. GIANNI RUN-reduplication, SWEAT MORE

"The more Gianni runs, the more he sweats"

(28) a. GIANNI SWEAT-reduplication, RUN-reduplication

b. GIANNI SWEAT-reduplication, RUN MORE[14]

"The more John sweats, the more he runs"

Interestingly, the internal coherence of the construction (reduplication in CP_1, but not in CP_2) shown by the pair (27b-28b) provides strong evidence that also the asymmetric variant is genuinely part of the language (rather just a signed version of a construction from spoken Italian).[15]

Another property of LIS CCs is the sensitivity to the kind of event/state described by the predicates that occur in the construction in LIS.[16] Let's consider the sentences in (29) through (32):

---

14. Reduplication in CP_2, but not in CP_1 is ungrammatical, and also the use of the sign MORE in both CP_1 and CP_2 is ungrammatical:

(i)   * RUN MORE, SWEAT-reduplication
(ii)   * RUN MORE, SWEAT MORE

15. Notice that the same pattern is found also in Japanese (reduplication in CP_1, but not in CP_2, and causality dependent on the order of the two clauses):

(i)   Yomeba yomuhodo oboeru.
           "The more you read, the more you learn"
(ii)   Oboereba oboeruhodo yomu
           "The more you learn, the more you read"

16. Many thanks are due to Sandro Zucchi for long and helpful discussion on this point.

(29) GIANNI RUN-reduplication, SWEAT-reduplication

"The more Gianni runs, the more he sweats"

(30) GIANNI RUN AT-LENGTH-red., SWEAT-reduplication

"The longer Gianni runs, the more he sweats"

(31) SEA DEEP-intensification, COLD INCREASE-reduplication[17]

"The deeper the sea, the colder the water"

(32) HAIR LONG-intensification, TIME DRY MORE

"The longer the hair, the more time to dry them"

At a first glance, it seems that CCs in LIS are sensitive to the kind of predicate and modifiers they involve. While (29) and (30) involve atelic event predicates and reduplication is found, in the sentences (31) and (32) the predicate of CP_1 is stative and a different morphology is involved, i.e. intensification (roughly, the movement of the sign is different from its citation form in that it is slower and the muscles are more tensed). Another interesting fact is that asymmetric variants behave like symmetric ones, as shown in (32), namely stative predicates do not reduplicate but intensify (of course, in the first clause only).[18]

17. As the reader can see from the video, it is not clear whether the sign glossed as INCREASE is reduplicated or not. In its base form INCREASE has a repeated movement, while in the sentence in (31) the movement is repeated twice (a total of at least four outward movements). This articulation could be interpreted as reduplication of the sign. However, it is not unusual for signs to be repeated, probably for prosodic reasons.

18. It worth noticing that this distinction between event and stative predicates has no equivalent in Italian. However, as pointed out by an anonymous reviewer, in Italian it is possible to have sentences like (i), where the two verbs are repeated (Italian has no reduplicative morphology). However, sentences of this sort have nothing to do with CCs in LIS, since they can be construed with stative predicates as well, as shown in (ii), but crucially cannot be construed with adverbs, as shown by the ungrammaticality of (iii) (see also the contrast with (30) in the text):

(i)   Gianni corre corre corre, suda suda suda.
         Lit. Gianni runs runs runs, sweat sweat sweat"

(ii)   Il mare è profondo profondo profondo (e) freddo freddo freddo.

That it is the kind of event that influences the morphological shape of the construction and not simply a categorial difference (i.e., verbs reduplicate, while adjectives intensify) can be deduced from (30), where it is the adverb that bears the reduplicative morphology.[19]

Further evidence would be provided by stative verbs in CCs. The prediction is that the stative verb be intensified and not reduplicated. However, it not easy to find clear examples where a stative verb appears in a CC. Indeed signers tend to introduce verb modifiers to make more explicit the meaning of the sentence. Unfortunately, in doing this they also modify the structure of the predicate from stative to eventive. So a sentence like (33a) has (33b) as its LIS counterpart:

(33) a. Più abiti a Milano, più inquinamento respiri

Lit. The more you live in Milan, the more smog you breath

b. MILANO LIVE AT-LENGTH-red., SMOG BREATH

INCREASE

"The longer you live in Milan, the more smog you breath"

Lit. The sea is deep deep deep (and) cold cold cold.

(iii)   a. * Gianni corre a lungo, a lungo a lungo, suda suda suda
         b. * Gianni corre a lungo, lungo lungo, suda suda suda
         Lit. Gianni runs at length length length, sweat sweat sweat.

These facts can be taken as further evidence that CCs in LIS are not the result of influence from spoken Italian.

19. However, the argument is not conclusive. Since adverbs have been analyzed as having [+ verbal] feature, while adjectives are claimed to have [+ nominal] feature, one can still argue that it is the verbal feature that determines the morphological output of the sign under the CC. As the reader can see from the discussion in the text, it is not easy to find definitive evidence: the issue remains open for further research.

A good test case could be a predicate like *to stink*; however also in this case, things are not so obvious in LIS. In a sentence like (34b), it is not clear whether STINK is a noun or a verb.

(34) a. Più puzzi, più le persone scappano

     b. STINK INCREASE-red., PEOPLE RUN-AWAY-reduplication

     "The more you stink, the more people run away"

However, indirect evidence that what is relevant for CC morphology is the kind of predicate and not its categorial *status* can be provided by sentences like (35):

(35) DOOR CLOSE-WITH-SEVERAL-LOCKS, SAFE MORE

     Lit. The more lockers you close the door with, the safer you are

Telic event predicates with a singular object such as *to close the door* are awkward in CCs. However, the informants accommodated the sentence modifying the event structure by adding some extra information,[20] indicating that what is crucial, in order to have a felicitous CC, is the appropriate event structure. For a more thorough investigation of the interaction of event/state predicate with CCs in LIS and Italian, see Geraci and Panzeri (in prep).

The last property I introduce here concerns *wh*-extraction. As we saw in section 3, *wh*-phrases appear in sentence-final position in LIS, as in (7) above, reported here as (36):

---

20. This fact can be the result of a broader strategy that signers may employ to reduce ambiguity.

(36) a. GIANNI BUY WHAT

   "What did Gianni buy?"

   b. HOUSE BUY WHO

   "Who bought a house?"

Consistent with the data in (36), *wh*-phrases appear in sentence-final position also in CCs, as shown in (37):

(37) STUDY-reduplication, LEARN LESS WHO

   Lit. "Who is such that, the more he studies the less he learns?"

However, an interesting pattern emerges when asymmetric extraction is considered. Up to now, we have just seen instances of CCs in LIS where the same individual is the subject of two verbs, namely the individual who runs more is the same one who sweats more in (23a), and the one who studies more is the same as the person who learns less in (37). However, CCs can have two independent subjects, one for each verb, as in (38):

(38) MUM SPEAK-reduplication, DAD SLEEP LESS

   "The more mum speaks, the less dad sleeps"

In principle, the presence of two distinct subjects in a CC leads us to two possible questions:

- We can ask **who sleeps**, while Mum speaks,
- We can ask **who speaks**, while Dad sleeps.

Actually, only one of these possibilities is realized in LIS, as shown by the contrast in (39) and (40):

(39) MUM SPEAK-reduplication, SLEEP LESS WHO

Lit. "Who is such that the more Mum speaks, the less he sleeps?"

(40) a. * SPEAK-reduplication WHO, DAD SLEEP LESS?

b. * SPEAK-reduplication, DAD SLEEP LESS, WHO?

Lit. "Who is such that the more he speaks, the less Dad sleeps?"

Wh-questions are only possible when the *wh*-phrase is extracted from CP_2, the second clause of the construction. Asymmetric extraction only from CP_1 is ungrammatical, with either short *wh*-movement, as in (40a), or long *wh*-movement, as in (40b).

4.3. *Summary*

Before turning to a syntactic analysis, let me briefly summarize what we discussed in this section. We saw that LIS displays two distinct variants to express the meaning of a CC, one symmetric, and one asymmetric. Both variants involve the morphological mechanism of reduplication with atelic event predicates (at least in CP_1). Both are typologically possible, although at present, no other language apart from LIS has been reported to employ both the possibilities. Nonetheless, the two constructions share the same core properties: the causality relation is inverted when CP_1 and CP_2 are inverted. Stative predicates do not reduplicate but intensify their movement. Finally, *wh*-extraction is possible from both clauses of the construction at the same time, but asymmetric *wh*-extraction is possible only from CP_2.

In the next section, I will provide a syntactic analysis for CC in LIS, and I will also address the issue of asymmetric extraction, showing that this property derives from the macroscopic structure of CCs.

5. The account

In section 4, I mentioned the fact that in the asymmetric variant only CP_2 is possible in isolation. This fact is compatible with an analysis of CP_1 in terms of a subordinate clause that is juxtaposed to the left of CP_2, the main clause, since typically only main clauses are possible in isolation. However things are not so obvious for the symmetric variant of CCs, because both clauses are possible in isolation. Since the two variants exhibit the same core properties, a unified analysis is to be preferred. This would require demonstration that CP_1 is a subordinate clause also in the symmetric variant.

The argument that I present here is based upon a syntactic distinction between complements and adjuncts: *wh*-extraction is possible from complements, but not from adjuncts. Before entering the details of my proposal, let me briefly illustrate how the argument goes with spoken languages. It is generally known that complements of transitive verbs are necessary elements for a well-formed clause, while adjuncts are optional elements, as shown by the contrast in (41):

(41) a. John wore a T-shirt at the party

　　　b. * John wore at the party

　　　c. John wore a T-shirt

The sentence in (41a) contains both a complement (the noun phrase *blue jeans*) and an adjunct (the prepositional phrase *at the party*). In (41b) the complement is dropped and the sentence is ungrammatical, while in (41c) the adjunct is dropped and the sentence is still grammatical. This

distinction between complements and adjuncts is due to the fact that complements typically saturate the argument structure of the verb, while adjuncts do not. Since saturation of the arguments of a predicate is a prerequisite for well-formed clauses, this explains why complements but not adjuncts are obligatory. Interestingly, the distinction between complements and adjuncts is also reflected in the syntax. In particular, *wh*-extraction is possible from complements but not from adjuncts, as shown in (42):

(42) a. John read a story about Halle in the book by Chomsky.

b. About whom did John read a story ___ in the book by Chomsky?

c. * By whom did John read a story about Halle in the book ___ ?

The sentence in (42a) contains a complement and an adjunct both modified by a prepositional phrase (*about Halle* and *by Chomsky* respectively). *Wh*-extraction of the prepositional phrase is possible if it is extracted from the complement, as in (42b), but not from the adjunct, as in (42c).

Of course, complements are not limited to noun phrases, and adjuncts to prepositional phrases, both can be clausal as well, as in (43-44) below:

(43) a. John says [CP that Mary wears T-shirts]

b. * John said

(44) a. John is happy [CP if Mary wears T-shirts]

b. John is happy

The CP in square brackets in (43a) is the complement of the main verb *says*, while the CP in square brackets in (44a) is an adjunct. As in the

examples in (41a-c), the complement is mandatory, as the contrast in (43) shows, and adjunct is optional, as shown in (44). Again, this semantic property has a syntactic counterpart in that *wh*-extraction is possible from the complement CP, but not from the adjunct CP, as illustrated in (45):

(45) a. What does John say [$_{CP}$ that Mary wears ___]?

b. * What is John happy [$_{CP}$ if Mary wears ___]?

c. * What [$_{CP}$ if Mary wears ___] is John happy?

In (45a), the *wh*-element is extracted from a clausal complement, and the sentence is perfectly grammatical. On the other hand, the *wh*-phrase extracted from the adjunct clause leads to ungrammaticality, whether the adjunct clause precedes or follows the main clause, as illustrated in (45b-c).
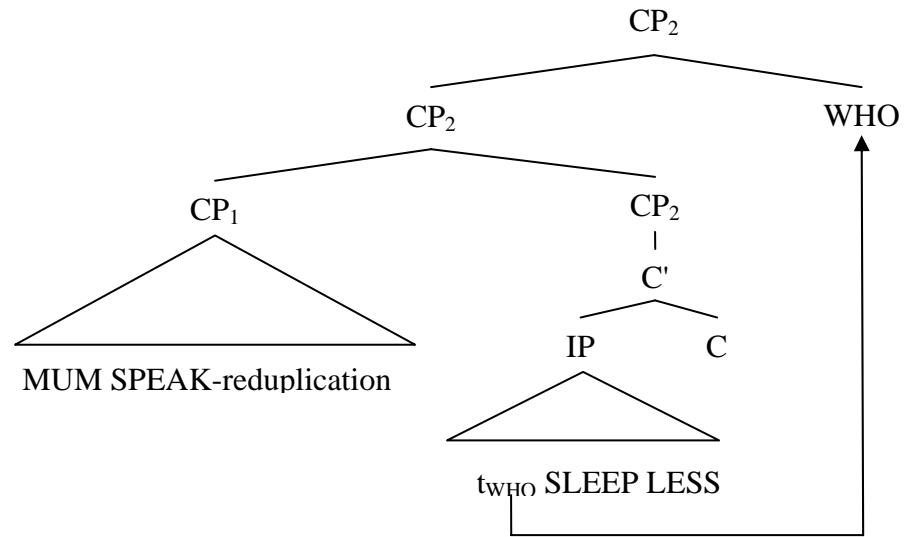
The impossibility of *wh*-extraction from adjuncts is part of a more general restriction on syntactic movement known as island constraints (Ross, 1967). The main idea is that adjuncts constitute a syntactic domain (island) that makes extraction impossible for *wh*-phrases.

With this in mind, let's now turn to CCs. Capitalizing on what was said about the strategy of relativization in LIS in section 3 above, namely that PE clauses are correlative constructions, a naïve analysis of CCs in terms of simple correlatives is the first thing that comes to mind. Technical details aside, a similar analysis has been proposed also for CCs in spoken languages by Den Dikken (2005) and Taylor (2006). In this section, I show that this approach proves to be sound and can explain the pattern of *wh*-extraction.

The macrostructure in (46) is what we expect under a correlative approach to CCs. CP$_1$ is treated like an adjunct to CP$_2$. The overall structure is that of a subordinate clause left-adjoined to the main clause.
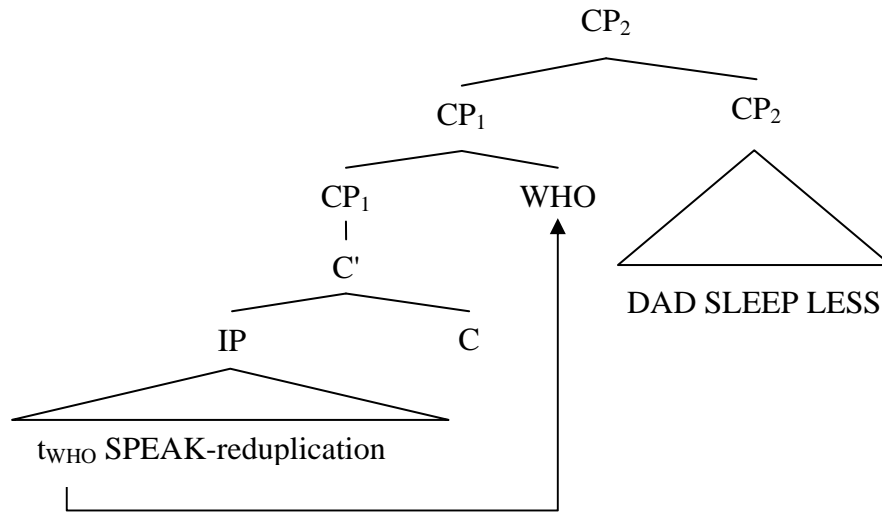
(46) **Macrostructure of CCs**

```
                        CP₂
              ┌──────────┴──────────┐
            CP₁                    CP₂
        ┌────┴────┐          ┌──────┴──────┐

  GIANNI RUN-reduplication      SWEAT-reduplication
```

The structure proposed in (46) accounts, without any extra assumptions, for the pattern of asymmetric *wh*-extraction observed in (39-40) above, repeated here as (47):

(47) a. MUM SPEAK-reduplication, SLEEP LESS WHO

Lit. who is such that the more Mum speaks, the less he sleeps?

b. * SPEAK-reduplication WHO, DAD SLEEP LESS?

c. * SPEAK-reduplication, DAD SLEEP LESS, WHO?

Lit. who is such that the more he speaks, the less Dad sleeps?

The example in (47a) is predicted to be grammatical, since it is a simple case of a subject *wh*-question, as shown by in the structure in (48a).

(48) a. **Structure for (47a)**

```
                                    CP₂
                            _____|_____
                          CP₂               WHO
                    _____|_____            ▲
                  CP₁           CP₂          |
                   /\            |            |
                  /  \           C'           |
                 /____\        __|__          |
        MUM SPEAK-reduplication IP    C       |
                              /\              |
                             /  \             |
                            /____\            |
                       t_WHO SLEEP LESS_____|
```

Sentence (47b) is ungrammatical since, presumably, it would involve local extraction to spec,CP_1. This movement does not produce a main clause *wh*-question (the main clause is CP_2) and leaves the relevant *wh*-feature of WHO unvalued, as shown in (48b).

(48)   b. **Structure for (47b)**

```
                            CP₂
                   ┌─────────┴─────────┐
                 CP₁                   CP₂
             ┌────┴────┐              ╱│╲
           CP₁       WHO            ╱  │  ╲
            │                     ╱────┴────╲
            C'                   DAD SLEEP LESS
        ┌───┴───┐
       IP        C
      ╱│╲
    ╱──┴──╲
  t_WHO SPEAK-reduplication
```

Finally, under this view, long distance *wh*-movement in (47c) is correctly excluded, since it requires extraction of the *wh*-phrase from within an adjunct clause, producing an island violation, as shown in (48c):

(48)   c. **Structure for (47c)**
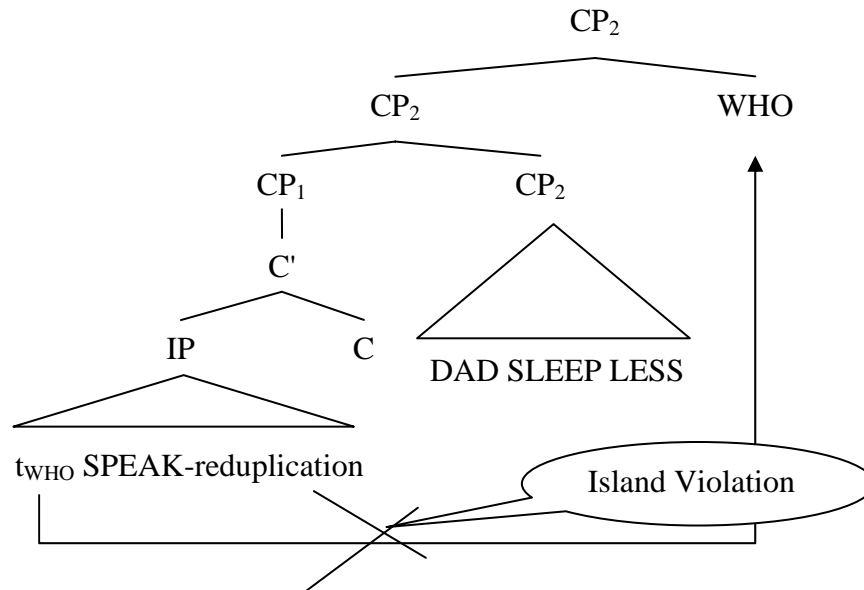
The fact that asymmetric extraction is possible only from CP_2 in both the symmetric and asymmetric variant of the CC is accounted for if both variants involve adjunction of CP_1 to the left of CP_2. Under this analysis, however, one thing is left unexplained that could be problematic, i.e., the grammaticality of *wh*-extraction from both clauses of a CC, repeated in (49):
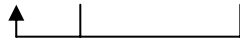
(49) STUDY-reduplication, LEARN LESS WHO

    Lit. "Who is such that, the more he studies the less he learns?"

The grammaticality of (49) could lead us to assimilate this movement to other similar cases of *wh*-extraction from both clauses of a conjunction, like the English example in (50):

(50) a. John runs and plays all day long

   b. who __ runs and __ plays all day long?

The sentence in (50a) is an instance of a conjunction, where the same noun phrase is the subject of both verbs. The sentence in (50b) is a *wh*-question where the subject of both predicates is a *wh*-phrase that has moved to the left periphery of the conjunction. The gaps indicate that the *wh*-phrase has moved from both subject positions. The sort of movement instantiated in (50b) is known as Across the Board (ATB) movement.

ATB extraction is governed by the Coordinate Structure Constraint (Ross, 1967), roughly a constraint that prohibits asymmetric extraction from either clause of a conjunction, but allows extraction from both clauses, as in (51):

(51) a. John runs and Paul walks

    b. * who John runs and ___ walks?

    c. * who ___ runs and John walks?

    d. who runs and plays all day long?

If the CC involved conjunction, an analysis in terms of ATB movement might be available, as sketched in (52):

(52)   **Structure for ATB movement (to be refined)**
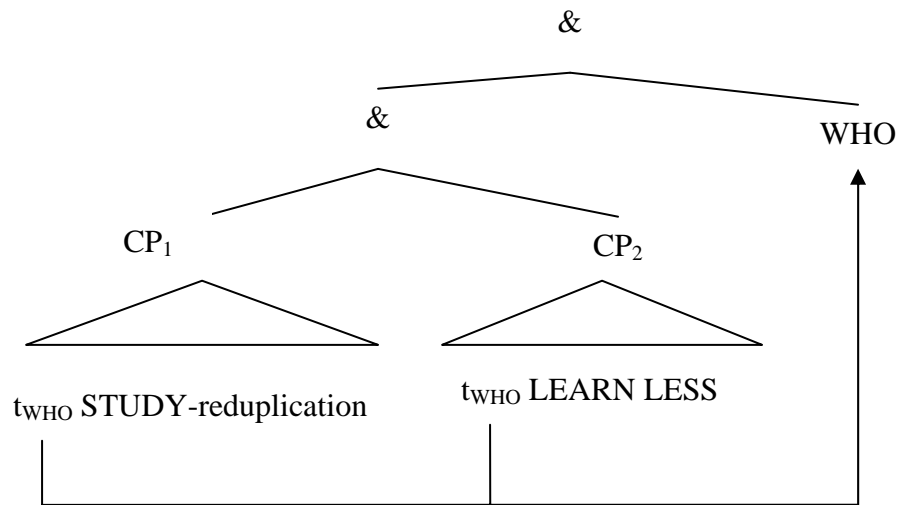
However, in addition to incorrectly predicting that *wh*-extraction from CP_2 would be ungrammatical, this analysis does not fit the facts that have been laid out earlier in this paper, since the CC involves subordination, not coordination. However, an account for (49), compatible with the structure in (46), can be provided if we analyze it as a case of parasitic gap.[21] Under this view, the sentence in (49) would be similar to sentences like (53), where a gap inside the adjunct PP is licensed under identity with a DP in the main clause:

(53) Which documents did the officer file ___ without reading ___*pg*.

---

21. Similar cases of ATB-like extraction from CC in spoken languages have been already analyzed in terms of parasitic gaps (Culicover and Jackendoff, 1999, and Den Dikken, 2005).

Roughly, in (49) *wh*-movement does not occur from both clauses but only from the main clause (CP$_2$), while the gap in CP$_1$ is licensed under identity with the *wh*-phrase in CP$_2$, as shown by the structure in (54):

(54)

CP$_2$

CP$_2$ WHO

CP$_1$ CP$_2$

pg STUDY-reduplication   t$_{WHO}$ LEARN LESS
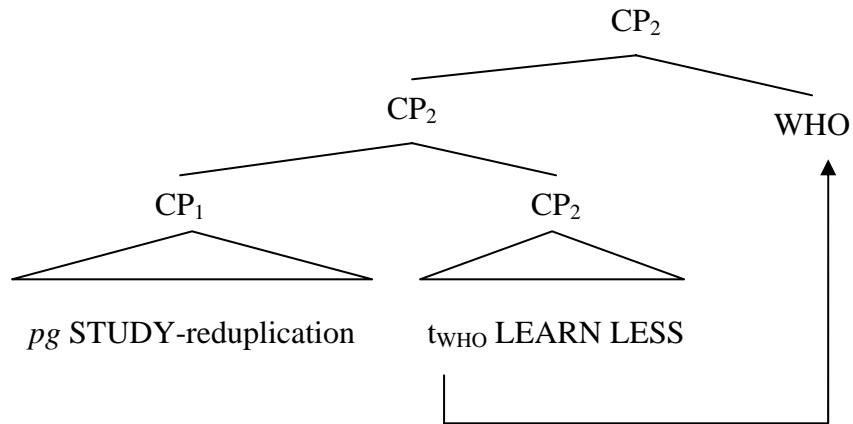
To conclude this section, the macrostructure of CCs proposed in (46) is sufficient to capture the pattern of *wh*-extraction in LIS.[22]

6. Conclusions

In this paper, I have shown that a particular construction of spoken languages is found also in a signed language, namely LIS. Despite the fact that this construction in LIS has two variants that are both

---

22. The analysis in the text provides a unified explanation for the *wh*-extraction data in both variants of CCs. This is probably due to the fact that at the relevant point in the derivation (i.e. where *wh*-movement applies) the macrostructure of the CCs is the one provided in (54) for both variants. However, as an anonymous reviewer correctly pointed out, it is also possible that the derivational processes that lead to the structure in (54) are completely different for the two variants (for an approach along these lines see Geraci and Panzeri, in prep).

typologically attested (one symmetric, the other one non-symmetric), the core properties that CCs display in LIS are the same as those found in spoken languages, strongly suggesting that this construction has core properties that are stable across languages and across modality. Further studies of other sign languages would be needed to confirm this last point, however.

It is particularly relevant that at a macroscopic level, the data on *wh*-extraction show that CCs in LIS are a genuine case of syntactic subordination and can be accounted for in terms of general phenomena widely attested in spoken languages, i.e. island constraints and parasitic gaps. Moreover, the fact that CCs are semantically analyzed as subordinate constructions is also reflected by the syntax of CCs in LIS, where there is clear evidence also for syntactic subordination, confirming that CCs are core part of UG and that there is no mismatch between these two components of the faculty of language. The approach developed for the analysis of CCs in LIS has the great advantage that no special assumption is needed in order to account for the syntactic properties of the construction. This implies that the surface syntactic properties of the construction in LIS can be captured by any model of processing that is able to capture the constraints on extraction from adjuncts. On the other hand, the fact that CCs are *correlatives*, presumably as PE clauses are, can be used as a working hypothesis to test models for the processing of LIS syntax.

Finally, turning back what has been observed in section 3, there seems to be a general strategy for subordination in LIS, involving a specific position in the left periphery of the sentence (roughly above subject position), where subordinate clauses are introduced by the [+ raised eyebrow] non-manual marking feature only (*if*-clauses, PE-clauses and asymmetric CCs). Since parallel observations can be made also for analogue constructions in the left periphery of ASL sentences (see Neidle, 2002), only future research can determine if this strategy of subordination is general for languages in the visual modality and whether this fact could depend on constraints imposed by other cognitive systems which are known to interact with language, such as short-term memory.

References

Barattieri C., Il periodo ipotetico in LIS. MA Thesis, Università degli Studi di Siena, 2006.

Beck S., "On the Semantics of Comparative Conditionals", *Linguistics and Philosophy*, 20, 1997, p. 229-71.

Branchini C., Donati C. Italian Sign Language relatives: correlatives, internally headed or free relatives? Ms, forthcoming.

Brunelli M., Antisimmetria e CP a sinistra. Paper presented at the workshop La grammatica della lingua dei segni italiana, Venice, 2007.

Cecchetto C., Geraci C., Zucchi S., "Strategies of relativization in LIS", *Natural Language and Linguistic Theory*, 24, 2006, p. 945-975.

Cecchetto C., Geraci C., Zucchi S, Another way to mark syntactic dependencies. The case for right peripheral specifiers in sign languages. Ms, Università degli Studi di Milano-Bicocca, forthcoming.

Chomsky N., *Barriers.* Cambridge, Mass, MIT Press, 1986.

Culicover P., Jackendoff R., "The view from the periphery: The English comparative correlative", *LI*, 30, 1999, pp. 543-71.

Den Dikken, M., "Comparative Correlatives Comparatively", *LI*, 2005 36:4

Geraci C., L'ordine delle parole nella LIS. MA Thesis, Università degli Studi di Milano, 2002.

Franchi M.L., Componenti non manuali. In (ed. Volterra) *La lingua dei segni italiana*. Bologna, Italy, il Mulino, 1987 (2004^2).

Geraci C., "L'ordine delle parole nella LIS". In *AA. VV., PARLATO ITALIANO in cd-rom*, proceedings of Convegno nazionale di Napoli, Feb. 13-15, 2003, Eds. Federico Albano Leoni, Francesco Cutugno, Massimo Pettorino, Renata Savy. Napoli, D'Auria Editore, 2004.

Geraci C., "Negation in LIS", *Proceedings of NELS 35*, U-Conn, University of Connecticut, USA, Oct. 22-24 2004. BookSurge Publishing, Amherst, Mass, 2006a.

Geraci C., LIS tra ricerca e divulgazione, Doctoral dissertation, Università degli Studi di Milano-Bicocca, 2006b.

Geraci C., Gozzi M., Papagno C., Cecchetto C, "How grammar can cope with a limited short-term memory: simultaneity and seriality in sign language", *Cognition*, 106, to appear.

Geraci C., Panzeri, F., Parallel merge and asymmetric structures. Ms Univeristà degli Studi di Milano-Bicocca, in prep.

Gozzi M., Geraci C., Crippa F., Cecchetto C., Papagno C., Memoria a breve termine verbale: tipi di errori di udenti e sordi nella rievocazione seriale. Poster presented at the AIP Conference, the conference of the Italian Association of Psychology, Como, Sept. 17-19.

Leung T. T-C.,Comparative Correlatives and Parallel occurrence of elements. Ms, USC, 2003.

Neidle C., "Language across modalities: ASL focus and question constructions". Ed. P. Pica, *Linguistic Variation Yearbook 2*, Amsterdam, John Benjamins, 2002, p. 71-98.

Neidle C., Kegl J., Maclaughlin D., Bahan B., Lee R. G., *The Syntax of American Sign Language*, Cambridge, Mass.: MIT Press, 2000.

Neidle C., Sclaroff S., Athitsos V., "SignStream™: A tool for linguistic and computer vision research on visual-gestural language data", *Behavior Research Methods, Instruments, and Computers,* 33, 2001, p. 311-320.

Pizzuto E., Giuranna E., Gambino G., "Manual and Nonmanual Morphology in Italian Sign Language: Grammatical Constraints and Discourse Processes". Eds. C. Lucas, *Sign Language Research. Theorical Issues.* Washington, DC: Gallaudet University Press, 1990, p. 83-102.

Ross J. R., Constraints on Variables in Syntax. Doctoral dissertation, MIT, Cambridge, Mass, 1967.

Taylor H., Out on good syntactic behavior, ms. University of Mariland, College Park, (2006).

Volterra V. (ed.), *La lingua dei segni italiana*. Bologna, Italy, il Mulino, 1987 (2004^2).