Chiara Branchini and Caterina Donati
University of Urbino

Istituto di Lingue
Piazza Rinascimento 7
61029 Urbino

Title:
Italian Sign Language relatives: a contribution to the typology of relativization strategies

Italian Sign Language displays a dedicated structure expressing relativization: a biclausal construction made of an embedded clause containing the antecedent, followed by a main clause containing a gap or a pronoun coreferent with the antecedent. This paper compares two possible analyses for such a construction: as a correlative structure, as recently proposed by Cecchetto et al. 2006, or as a non correlative internally headed relative clause. Evidence for the nominal status of the clause, for its extraposition, and for the trace nature of the gap in the main clause is provided and discussed, leading to the conclusion that the non-correlative analysis is more suitable. As for their interpretative status, we argue that PE-clauses are restrictive at the light of a battery of diagnostics.

Keywords
Italian Sign Language, relative, correlative, restrictive, head-movement

0. Introduction

Italian Sign Language (LIS) is the language of the Italian Deaf community. A 50.000 people spread all over the peninsula, in most cases invisible and marginalized by the Italian (hearing) society[1]. As most sign languages, it is very poorly known to core linguistic research, its original and intricate properties being either ignored or relegated to the field of "applied linguistics". This paper aims at reminding that a sign language such as LIS can and must provide important data for our understanding of core syntactic categories and operations. Starting from the seminal work by Cecchetto, Geraci and Zucchi 2006, it will provide a new analysis of a peculiar relative construction which seems to force the strict boundaries of standard typology of relativization strategies in the languages of the world, and to call for a rethinking of its categories.

After clarifying the methodology adopted for data collection (section 1), we briefly present some basic properties of LIS syntax (section 2). Section 3 presents the construction the paper is devoted to, the structure translating English relative clauses, which we label PE-clause. Two distinctive features of the PE-clause, namely that of being always at the left of the main clause and that of having the antecedent sitting internally, are then discussed at the light of two competing analyses (section 4): what we might call the correlative analysis (as specifically proposed by Cecchetto et al. 2006: §4.1), and what we shall label the extraposed internally headed analysis. Articulated evidence pointing toward the latter is then provided (4.2,4.3), and a new implementation of such analysis is discussed and tentatively extended to similar constructions in other languages (section 5). Section 6, finally, discusses whether PE-clauses are to be analyzed as restrictive or as appositive in nature. After questioning the validity of some apparent evidence supporting their appositive status, we conclude at the light of a battery of standard diagnostics that PE-clauses are restrictive.

1. Research methodology

[1] See Caselli, Maragna and Volterra 2006 for a survey of the socio-linguistic and socio-cultural situation of the Italian Deaf community.

The data we present and discuss come from five native deaf signers of LIS, that is, from Deaf people who have been exposed to Italian Sign Language from birth. Natives represent a minority in the community of deaf signers where about 95% are born from hearing parents. The informants come from different regions of Italy (two pairs of siblings from Ancona and a signer from Rome) and they all share a native linguistic competence, a strong Deaf cultural identity and a good knowledge of Italian as a second language. All of them are active members of the local Deaf community. While the siblings from Ancona had never been interviewed before in the framework of a linguistic research, the signer from Rome is a LIS teacher and has collaborated with other linguistic inquiries in the past (coordinated by Virginia Volterra's research group in Rome).

Despite some lexical differences reducible to dialectal variation and their initial disparity in meta-linguistic awareness, our informants provided us with a homogenous collection of LIS data, all using the same construction when asked to produce the equivalent of an Italian relative clause. The data were elicited through the aid of a LIS interpreter who presented the signers a relevant context she referred to with some questions. At a very initial stage, when we needed to elicit highly specific constructions, such as relative clauses headed by quantifiers or numerals, the signers were presented with some written Italian sentences and were asked to produce the most natural LIS translation given a contextual background for their interpretation.

The final output of the procedure was videotaped and analyzed through SignStream, a software developed at Boston University to create and analyze sign language databases[2]. The data provided in this paper follow the standard convention of using capitalized words for signs. Coindexing signals coreference. The line over the glosses stands for the nonmanual component realized simultaneously to the sign(s) it dominates[3].

2. Some basic syntactic properties of LIS

In this section, we will present a quick description of some basic LIS syntactic properties. This is meant to provide the reader with the necessary background for evaluating the analysis of LIS strategies of relativization the paper focuses on. We will briefly show how space and directionality are used for linguistic purposes and how the simultaneous realization of the manual and nonmanual components (i.e. face expressions, body lean, head tilt and movement of the shoulders: NMMs) enter into the building of syntactic structures.

The basic word order of LIS is SOV, as illustrated in (1).

(1) DOG CAT CHASE
'The dog chases the cat'

Together with many derived orders due to extrapositions, SVO is also attested, but seems to be employed mostly when signers interact with non natives who are influenced by the dominant SVO order of Italian[4].

All functional categories within the clausal domain are located postverbally. The aspectual marker DONE, which marks the verbal action as completed, occurs after the verb, as in (2).

(2) DOG CAT CHASE DONE
'The dog has chased the cat'

Modals are also located postverbally: (3).

[2] Information on SignStream is available at http://www.bu.edu/asllrp/SignStream. See Neidle, Sclaroff and Athitsos 2001 for details.
[3] The clips corresponding to the examples discussed are available at: www.uniurb.it/lingue/docenti/donati (click 'pubblicazioni scaricabili').
[4] As recently demonstrated in Geraci 2002.

(3) DOG CAT CHASE CAN
'The dog can chase the cat'

Negation is also found after the verb, as shown in (4)

(4) DOG CAT CHASE NOT
'The dog does not chase the cat'

The same holds for (manual) manner adverbs[5]: see (5).

(5) ANNA LEAVE ON-TIME
'Anna leaves on time'

Finally (6) shows that the *wh*-phrase is also at the right periphery of the sentence.

(6) CAT CHASE WHO
'Who chases the cat?'[6]

We can now try to combine these various postverbal elements. Manner adverbs, when present, need to precede the aspectual marker DONE, negation, and modal verbs: see (7).

(7) ANNA LEAVE ON-TIME DONE/NOT/MUST
a.'Anna has left on time'
b.'Anna did not leave on time'
c.'Anna must leave on time'

Negation and DONE are in complementary distribution perhaps due to some semantic incompatibility (Zucchi 2003); the same holds for modals and DONE. Modals precede negation (8).

(8) ANNA LEAVE MUST NOT
'Anna must not leave'

The *wh*-phrase is always the rightmost element of the right periphery:

(9) CAT CHASE MUST NOT WHO
'Who must not chase the cat?'

This distribution suggests that the functional projections hosting all these elements are located at the right of the verb phrase.

Turning now to the left side, time adverbials are always found in sentence-initial position as in (10).

(10) YESTERDAY DOG CAT CHASE DONE
'Yesterday the dog has chased the cat'

Putting all this information together, we claim following Cecchetto et al. 2006 that LIS is a head final language. We assume the subject to originate in Spec, VP and to raise to Spec, IP, while the object sits in its base position within the VP. While manner adverbs are taken to be right adjoined to VP, time adverbials are taken to be left adjoined to IP. Negation occupies a position between CP and IP (see Geraci 2006 for a

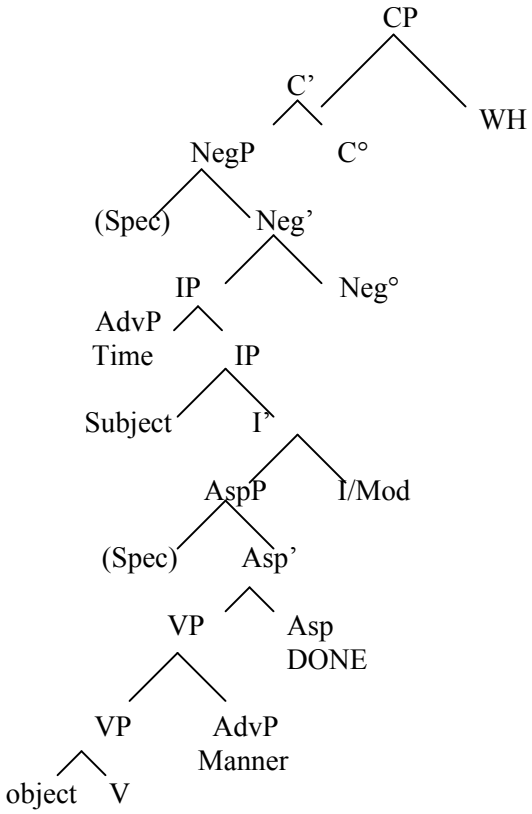
[5] Notice that there are three typologies of manner adverbials in LIS: some of them are expressed manually as a separate sign (e.g. ON TIME in (5)); others are incorporated in the verb by altering its movement; others are realized nonmanually simultaneously to the verb.

[6] As glossed here (6) might be ambiguous (*Who chase the cat?/Who does the cat chase?*). See below for the role of NMMs for disambiguating this kind of sentences.

detailed analysis). As for the *wh*-phrase, the analysis proposed by Neidle et al. 2000 for American Sign Language (ASL) and extended to LIS by Cecchetto and Zucchi 2004, identifies its position with the Spec, CP assumed to be right branching. The issue is controversial, at least for ASL: see Wilbur and Patschke 1999 and Petronio and Lillo Martin 1997. We will not take any position on this, as it is not relevant for our analysis.

The diagram in (11) adapted from Cecchetto et al. 2006 illustrates all these basic claims.

(11)



LIS allows both subject and object drop, with the verb agreeing in space with the position(s) associated with the non overt argument(s).

(12) pro_i $_iGIVE_j$ pro_j
'He/she gives him/her'

Agreement in space is a general mechanism in LIS, as in other sign languages. In (12) the movement of the sign for *give* is modified so as to start in the position in space associated with the subject and to end in the position associated with the object. Agreement in space is thus an agreement marker. For sake of simplicity, we shall not signal verbal agreement in our glosses.

Another important function of agreement in space is illustrated in (13), where the sign for *his* is articulated in the position associated with its antecedent *friend.*

(13) $FRIEND_i$ POSS SONS $POSS_i$ ALL LEAVE DONE
'My friend's sons all left'

Agreement here signals coreference[7]. While this is always the case with signs produced in the neutral space, this is not necessarily so with body-anchored signs. The glossing we adopt here does not make any

[7] Bahan 1996 shows for ASL that coreference and verbal agreement can be signaled by nonmanual markers as well. Although no specific research on this has been carried out yet, it seems to be true in LIS as well.

difference, simply and systematically using coindexing to mark the linguistic phenomenon of coreferentiality, independently from its realization.

Finally, LIS, as all sign languages, exploits nonmanual means to mark a number of syntactic features, such as negation, question, condition, topic, focus etc. To illustrate, the following LIS examples are minimal pairs where the negative (14a), interrogative (14b), conditional (14c) status of the clause is given by different nonmanual markers.

(14) a. DOG CAT CHASE (neg)
'The dog does not chase the cat'
b. DOG CAT CHASE (y/n)
'Does the dog chase the cat?'
c. DOG CAT CHASE CAT SCARED (cond)
'If the dog chases the cat, the cat gets scared'.

Very roughly, 'neg' corresponds to furrowed eyebrows and left-to-right head shakes; 'y/n' corresponds to raised eyebrows, wide eyes, and forward body lean; 'cond' corresponds to raised eyebrows, a general tension of eyes and cheeks and forward head tilt[8].

According to a number of studies (see a.o. Neidle et al. 2000; 2002, Petronio and Lillo-Martin 1997, Pfau 2004, for ASL and other sign languages, Cecchetto and Zucchi 2004 for LIS), the extent of the spreading of the NMM is an indicator of syntactic dependencies. To illustrate, in the example (6) repeated here as (15), the wh-element might in principle be interpreted both in object and in subject position. The spreading extent of the wh-NMM disambiguates it: in (15a) the non manual spreading signals that the wh-element is interpreted in object position, while in (15b) its spreading signals that the wh-element is interpreted in subject position.

(15) CAT CHASE WHO
a. CAT CHASE WHO (wh)
'Who does the cat chase?'
b. CAT CHASE WHO (wh)
'Who chases the cat?'

As is clear from this overview, much of LIS syntax still awaits a proper description. This is definitely the case for the nominal domain. LIS does not have any (manual) sign for definite or indefinite articles, but other determiners, such as numerals, demonstratives and quantifiers are attested, and seem to occur both pre- and post-nominally. In a sentence like (16), to illustrate, any ordering of N and D seems to be acceptable. However there is a preference for the determiner to follow the noun. We are not able to provide an adequate account of these ordering possibilities but given the systematic complement-head order illustrated in (11) we will provisionally assume N-D to be the basic order.

(16) DOG_i IX_i CAT_j IX_j CHASE

[8] See Volterra 2004, Zucchi 2004 for a more accurate characterization of the nonmanual markings (NMMs) in LIS. Notice that NMMs can co-occur with a corresponding manual sign, as shown in (4) repeated here in (i) for negation, this having an impact on its spreading extension and realization: see Geraci 2006 on negation

(i) DOG CAT CHASE NOT (neg)
'The dog does not chase the cat'

'This dog chases that cat'

This assumption will play some role in the analysis we will propose for LIS relative clauses.

3. LIS PE-clauses

Our data attest the presence of a specialized syntactic structure used by native signers as a strategy for relativization. This is a bi-clausal construction including a sentence-initial clause (which we will call 'PE-clause' from the presence of a specific sign we label 'PE') and a sentence-final clause. The PE-clause, which cannot be produced on its own, is overtly identified by two superficial characteristics:

a. the sign here glossed as PE[9] due to the co-occuring silent articulation of a labial stop. It is manually realized with the index finger stretched out and shaken downwards and systematically occurs at the right edge of the clause (after modals, aspect and negation: Cecchetto et al. 2006). PE is coreferential with an NP within the clause, and as usual this coreferentiality can be realized through agreement in space.

b. the nonmanual marking glossed as 'rel' consisting of raised eyebrows and tension of eyes and upper cheeks. Its realization and spreading may vary in a way which we shall discuss below, but it reaches its maximal intensity over the sign PE.

The second clause, which we might call 'main' since it can be uttered in isolation, contains what we might descriptively call the 'correlate': a gap or an indexical (glossed IX) interpreted as coreferential with the NP PE is coreferential with. Following the tradition, we shall call 'antecedent' this 'pivotal' NP.

To illustrate, the examples in (17) and (18) provide a minimal pair, where the presence or the absence of the properties (a-b) listed above correlate with a sharp difference in interpretation: (17) is a coordination of two independent sentences, while (18) is a relative construction.

(17) DOG_i CAT CHASE (IX_i) HOME COME DONE
'The dog chased the cat and came home'

(18) $\underline{\qquad\qquad\qquad\qquad\text{rel}}$
DOG_i CAT CHASE PE_i (IX_i) HOME COME DONE
'The dog that chased the cat came home'

Cecchetto et al. 2006 show that the antecedent cannot be fully reduplicated in the main clause: no full NP can be realized in the position of the correlate, as the agrammaticality of (19) shows:

(19) $\underline{\qquad\qquad\qquad\qquad\text{rel}}$
*DOG_i CAT CHASE PE_i DOG_i HOME COME DONE
'The dog that chased the cat came home'

As for the position of PE, we have assumed so far that it is the rightmost element within the PE-clause, but we further need to demonstrate that it does not belong to the main clause. In (20) the time adverbial YESTERDAY refers to the matrix clause and follows the sign PE. Since time adverbials always mark the left edge of their clauses, (20) is clear evidence that PE does not belong to the main clause. Such a clausal boundary after PE may also be signaled through other prosodic means: a pause, an eye blink, the abrupt ending of the NMM characterizing the PE-clause.

In what follows, we provide a full-fledged paradigm instantiating all possible combinations of the functions carried out by the antecedent in the PE-clause and the correlate (overt or silent) in the main clause.

In (20) the correlate is the subject of the main clause, and the antecedent NP (MAN) is understood as the subject of the PE-clause.

[9] 'PE' corresponds to 'PROREL' in the glosses provided by Cecchetto et al. 2006, where this element was first identified.

Subj-Subj

(20) TODAY MAN_i PIE BRING PE_i YESTERDAY (IX_i) DANCE
rel
'The man that today brought the pie yesterday danced'

In (21) the correlate is the object of the main clause and the antecedent (DOG) is the subject of the PE-clause.

Subj-Obj

(21) DOG_i IX_i EAT A-LOT PE_i $DOCTOR_k$ VET (IX_i) BRING
rel
'I took to the vet the dog that eats a lot'

In (22) the correlate in the main clause is in subject position and the antecedent (DOG) corresponds to the object of the PE-clause.

Obj-Subj

(22) DOCTOR VET IX_i DOG_i BRING PE_i (IX_i) EAT A-LOT
rel
'The dog that I took to the vet eats a lot'

In (23) the correlate corresponds to an object position in the main clause and the antecedent (DOG) is the object of the PE-clause.

Obj-Obj

(23) YESTERDAY DOG_i FIND PE_i $PAOLO_k$ IX_k (IX_i) WASH
rel
'Paolo washed the dog that I found yesterday'

Finally in (24) through (26) we find various combinations where the antecedent is an adjunct and the correlate an argument (24); both are adjuncts (25); the antecedent is an argument and the correlate in the main clause an adjunct (26).

Adj-Arg

(24) $GIRL_i$ STUDY WITH PE_i GIANNI LIKE (IX_i)
rel
'Gianni likes the girl with whom I study'

Adj-Adj

(25) SON MY PLAY NEAR $TABLE_i$ PE_i (IX_i) IX KEY FORGOT
rel
'I forgot the key near the table where my son plays'

Arg-Adj

(26) MARIA $TABLE_i$ BURN PE_i (IX_i) NEAR CHILD PLAY
rel
'The child plays near the table that Maria burnt'

From the paradigm sketched above, we observe that the antecedent is always internal to the PE-clause. This is confirmed by the distribution of time adverbials, which, as we have seen, are always in sentence initial position in LIS, and precede the antecedent, as illustrated in (23).

Our data do not show a different relativization pattern for the different roles carried out by the antecedent in relation to the PE-clause and to the main clause. More specifically, the PE-clause always

translates the equivalent of the Italian relative clause[10]. As (27) shows, this conclusion holds also for abstract antecedents.

(27) PAOLO MARIA IDEA$_i$ SUGGEST PE$_i$ IMPORTANT (rel)
'The idea that Paolo suggested to Maria is important'

As the data show, there is some variation in the spreading of the NMM 'rel'. While the most frequent pattern is that of 'rel' spreading over the entire PE-clause, other options are also produced by our informants. 'rel' might also be realized:

a. only over the sign PE, as in (28);

(28) DOG CAT CHASE PE (rel) HOME RETURN
'The dog that chases the cat came home'

b. over the material intervening between the antecedent and PE, as in (29) and (26) above.

(29) STUDENT$_i$ EXAM DONE PE$_i$ (rel) ALL$_i$ PASS
'The students that took the exam all passed'

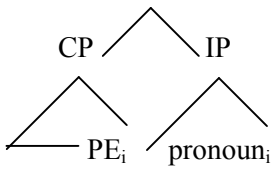
While all these spreading possibilities are consistent with the analysis of PE clauses we shall provide in the next section, we ignore the reasons driving the choice between them.

4. Correlatives or internally headed relative clauses?

Turning now towards an analysis and trying to interpret these data at the light of the standard typology of relativization strategies, we can safely claim what PE-causes are not. PE-clauses are not externally headed relative clauses, since the antecedent systematically sits within the clause itself (Cecchetto et al. 2006). Moreover, we know for sure that PE-clauses are not free relatives if the defining property of the latter is to lack an antecedent in the form of an overt NP.

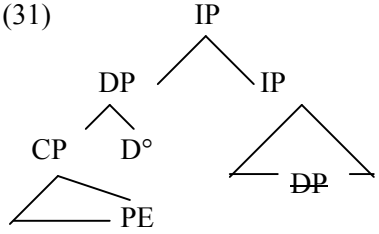
We are left with two types that appear to be compatible with our data: that of correlative clauses, and that of extraposed internally headed relative clauses. These two analyses are sketched in the abstract structures given in (30) and (31), respectively.

(30) correlatives



[10] Cecchetto et al. 2006 report frequent 'reversals', where the input relative clause is translated in the LIS counterpart as a main clause and vice versa. The informants would give e.g. (ii) to express the sentence in (i) below.
(i) Maria kissed a boy that left
(ii) MARIA$_I$ BOY$_J$ $_I$KISS$_J$ PE$_J$ LEAVE DONE
We were not able to elicit any of such reversals. See section 6 for a discussion.

(31) extraposed internally headed relatives



While (30) and (31) share the property of having the antecedent sitting internally to the clause, they display three crucial differences. The first one concerns the categorial status of the PE-clause: a simple CP in (30), a (complex) DP in (31). The second difference has to do with the relation of the PE-clause with the main clause. Given the correlative structure in (30), the two clauses start as two independent adjoined clauses[11]. In (31), on the other hand, the PE-clause is first merged within the main clause, in the position of the correlate (the base position for relatives) and then extraposed to a left-adjoined position. The third difference concerns the nature of the nominal correlate in the main clause: a pronoun in (30); a trace in (31).

In the remnant of this section we shall compare in detail these two analyses at the light of a number of empirical facts concerning PE and its clause. Rather than referring to the correlative option in its abstract version in (30), we will discuss the actual analysis proposed by Cecchetto et al. 2006, which is essentially an implementation of this very option[12].

4.1 A correlative analysis: Cecchetto et al. 2006

Cecchetto et al. 2006 argue for a structure as in (32).

(32) $[_{IP}\ [_{CP}\ldots..NP_i\ t_i\ \ldots\ldots PE_i\ ]\ [_{IP}\ \ldots\ldots.PRONOUN_i\ \ldots..]]$

The defining traits of (32) are the following. The construction is formed by two conjoined clauses. The first clause (PE[13]-clause) involves the movement of the demonstrative-like element PE from its base position at the right of the antecedent NP to the Spec, CP of the clause (which is arguably on the right: see above). The second clause is a simple IP, with a pronominal (what we called the correlate) referring to the antecedent NP. Being LIS a *prodrop* language, such pronominal can be non-overt (*pro*).

As an evidence for the movement of PE, Cecchetto et al. 2006 provide the sentence in (33), produced by one of their informants (and considered marginally acceptable by the others).

(33) BOY_i PE_i PHONE LEAVE DONE
'The boy that called left'

Such an optional (overt) movement is motivated within the semantic analysis Cecchetto et al. 2006 provide for the construction, which we will not review in any detail. We can simply say that under this analysis, PE is the element that has the function of connecting the CP to the main clause. It moves either overtly or covertly to Spec, CP in order to scope over its clause and take it as its argument. In this position, PE turns the PE-clause into a generalized quantifier (Dayal 1996's analysis for Hindi correlatives).

The analysis of the pronoun in the main clause as an e-type anaphora is related to another crucial property according to Cecchetto et al. 2006, namely the fact that PE-clauses are non restrictive. However,

[11] But as we shall discuss later in the paper, Bhatt 2003 provides a number of arguments showing that the left adjoined position of the clause in Hindi correlative constructions is derived through movement as well. See below, section 4.3.

[12] See Citko (this volume) for a very detailed survey of the properties of correlatives as opposed to full relatives and free relatives.

[13] As already signalled in fn 9, Cecchetto et al. 2006 use a different label for the element we gloss PE, namely PROREL. For sake of simplicity, we reframed their analysis discussed here unifying the terminology and systematically replacing their PROREL with the more descriptive PE.

since there seems to be no direct link between the syntactic type of a relativization strategy and its restrictive or non restrictive interpretation we shall postpone the discussion about this issue to section 6 and keep it separate from the assessment of the syntactic analysis to be given to the PE-clause.

The analysis in (32) has a number of straightforward advantages: first of all, it derives without any further assumption the systematic occurrence of the PE-clause at the left; second, given that full NPs cannot be bound while pronominals can, it predicts correctly that the main clause can never contain a full NP in the relevant position. Finally, the claim that (32) is a correlative construction is consistent with classical typological generalizations according to which correlatives are a prerogative of SOV languages[14] (Downing 1973).

Let us now go back to the three distinctive properties discriminating between the correlative analysis and its alternative: the categorial status of the PE-clause; the nature of the correlate; the relation of the PE-clause to the main clause and discuss some empirical data that might orient the choice of the most suitable structural hypothesis.

4.2 Evidence for the nominal status of the PE-clause

As we already mentioned discussing the two abstract structures in (30-31), a crucial difference between the two available analyses concerns the categorical status of the PE-clause: a simple clause under the correlative analysis; a nominal clause (i.e. a relative) under the internally headed relative analysis. Any evidence pointing at nominal properties of the PE-clause would then advocate for the latter. In what follows we shall present some data going in this direction.

The first fact concerns the possibility of having the PE-clause modified by ordinals, as illustrated in (34).

(34) rel
FIRST WOMAN$_i$ KISS$_i$ PE$_i$ NOW BANK WORK
'The first woman I kissed now works in a bank'

As the translation clearly shows, the ordinal FIRST in (34) does not simply modify the antecedent WOMAN (the sentence does not entail that I kissed the first woman ever existed, or the first one in a row, etc.), but the entire PE-clause itself, namely the woman I kissed. FIRST cannot therefore be assigned a position internal to the clause, but rather a higher one, external to it. However ordinals cannot usually modify clauses (not even extraposed ones), neither in LIS nor in any language. Ordinals are restricted to modify nominals, either simple (35a) or complex (35b).

(35) a. The first woman/one
b. The first woman I kissed

There might be in principle an alternative analysis of (34) not implying that the PE-clause has any nominal feature: FIRST might be an adverbial modifying the verb, as in *the woman I kissed first*[15]. This alternative can be excluded however since LIS displays no lexical ambiguity in this respect, having two separate signs for ordinal FIRST and adverbial FIRST.

A second piece of evidence for the nominal status of the PE-clause might come from a closer look at the nature and position of the sign PE itself. Notice first of all that the sign PE is not used exclusively in the context we have labeled PE-clause. We find it as well in nominal contexts, as illustrated in (36) through (39).

(36) FIRST PE
'The first one'

(37) SMALL PE

[14] This crosslinguistic generalization has been challenged recently: a.o. see Liptak 2005 for Hungarian Pancheva 1997 for Bulgarian: SVO languages displaying correlatives.
[15] We thank Carlo Cecchetto for pointing out to us this possibility.

'The small one'

(38) RED PE
'The red one'

(39) MY PE
'Mine'

In all the examples above PE appears to carry out the function of a determiner nominalizing the constituent. In other cases, it can co-occur with an NP as a determiner strongly marking the referent, as in (40)[16].

_____rb
(40) $HOUSE_i$ PE_i $ANNA_i$ IX_i BUY WANT
'It is a house that Anna wants to buy'

Finally, besides its interpretation and distribution, PE also shares with LIS determiners a similar morphology: both PE and, say, THAT can agree in space with an NP, either present in the clause or in the discourse context.

If PE is to be analyzed as a determiner, its optional position next to the antecedent attested in Cecchetto et al. 2006 (see (33) above) and confirmed by some of our informants is predicted. (41) illustrates this option again.

_____rel
(41) CHILD PE COMPETITION WIN TEACHER PRIZE GIVE
'The teacher gives a prize to the child who has won the competition'

As for the standard position of PE, i.e. the right periphery of the PE-clause, we already know that it sits in a position higher then Negation, Aspect and Modal, presumably in the CP area. We will argue in section 5 that it sits in a position high enough to project its categorical D status nominalizing the entire clause.

4.3.Evidence for the correlate being a trace

Recall that the antecedent in the PE-clause is always coreferential with a nominal position in the main clause we called the correlate. One crucial difference between the two analyses we are comparing concerns the nature of this correlate: an anaphoric pronoun in the correlative analysis; a nominal trace (that of the extraposed relative clause) in the extraposed internally headed analysis. As a matter of fact, the data show a systematic optionality of the realization of the correlate, which can be either a gap or an indexical. Both analyses have an easy way to account for this optionality: Cecchetto et al in press relate the possibility of omitting the pronoun to the prodrop nature of LIS. As for the extraposition analysis, it can reduce the pronoun that optionally surfaces to a resumptive strategy spelling out the trace, which is reported to be a widespread mechanism both in sign and in spoken languages.

Notice that the correlate can also be realized as a quantifier, as shown in (42) and (43).

_rel
(42) $CHILDREN_i$ CAKE EAT PE_i TODAY ALL [e] STOMACHACHE
'All the children that ate the cake today have stomachache'

_____rel
(43) BOY_i EXAM DONE PE_i PASS NOBODY[17]
'No boy that took the exam passed'

[16] Notice that in (40) the NP modified by PE is obligatorily extraposed. Together with its focus interpretation, this characteristic might advocate for a cleft analysis of the construction: see Branchini 2007 for details.

[17] For the position of NOBODY at the end of the clause as a general rule for negative words in LIS see Geraci 2006.

The distribution and interpretation of quantifiers in our LIS construction is quite intricate and interesting: we shall discuss it in detail in section 6. For the time being, it is sufficient to show that the presence of ALL or NOBODY in the correlate position is compatible with both analyses: under the extrapositon analysis, ALL can be interpreted as a floating quantifier (Sportiche 1988); under the correlative analysis, ALL can be seen as a possible realization of the anaphoric element.

The two analyses differ, however, in their prediction when the correlate is in an oblique position[18]. The correlative analysis predicts that the pronoun should be obligatorily realized since the verb morphology cannot license *pro* in that position; the extraposition analysis predicts that the same optionality observed in argument position should hold.

The LIS data appear to confirm the prediction of the extraposed internally headed analysis. As shown in (44) and (45), the correlate might be a gap even in an oblique adjunct position. (46) shows that *pro* is not licensed in an oblique position in LIS.

(44) SON MY PLAY NEAR TABLE$_i$ PE$_i$ (IX$_i$) ON IX KEY FORGOT (rel)
'I forgot the key near the table where my son plays'

(45) MARIA TABLE$_i$ BURN PE$_i$ (IX$_i$) NEAR CHILD PLAY (rel)
'The child plays near the table that Maria burnt'

(46) *CHILDREN PIZZA EAT NEAR
*'Children eat pizza near'

4.4. Evidence for extraposition

The third distinctive feature discriminating between the two analyses we are discussing concerns the relation between the two clauses of the construction: in the correlative option, the PE-clause is merged in a position left adjoined to the main clause, while in the alternative relative clause analysis, it is merged in a position internal to the main clause (the correlate position) and extraposed to the left. In what follows we will present some facts all pointing towards an extraposed analysis for the PE-clause.

The first piece of evidence has to do with the NMM obligatorily associated with the PE-clause. Available descriptions of the various NMMs in LIS and their respective functions are far from being exhaustive in the literature[19]. However, as far as we know, at least one component of the relevant nonmanuals marking this structure is not an exclusive prerogative of PE-clauses. Rather, it is found in a number of syntactic environments, in different combinations with other markers.

Trying to characterize what we have labeled 'rel' in some detail, we can say that it is a complex marking which includes at least two components: raised eyebrows ('rb') and 'tensed eyes' ('te'), a peculiar tension in the upper area of the face including cheeks and eyes. While the former is indeed present in many syntactic environments such as yes/no questions, conditionals, topics and focus, the latter appears to single out extraposed constituents. To illustrate, while (47), (48), and (49) exhibit raised eyebrows, the peculiar tension 'te' is only found in (48) which is a topic, and in (49) which is a contrastive focus.

(47) DOG CAT CHASE (y/n)
'Does the dog chase the cat?'

(48) YES CAR SILVER, IX SEE DONE (topic)
'Yes, the silver car, I saw it'

[18] Cable (this volume) applies similar testings to a relative-like construction in Tibetan, obtaining opposite results, in line with the predictions of the correlative analysis.
[19] See Franchi (1987) for an overview.

__focus
(49) CAR SILVER, IX BUY DONE
'The SILVER car, I bought'

Awaiting for a more detailed analysis of the typology of NMMs in LIS, we can take this observation as a provisional piece of evidence that PE clauses belong to the family of extraposed constituents. Interestingly, a similar conclusion has been drawn for relative clauses in other sign languages, where relative clauses share with extraposed constituents both the NMMs and their position: see Aarons 1994, Neidle et al. 2000 among others for (cor)relative clauses in ASL and Pfau and Steinbach 2005 for relative clauses in German Sign Language (DGS).

The extraposed status of the PE-clause can be reinforced by another consideration. LIS syntax systematically requires embedded clauses to sit in peripheral position, either at the left or at the right. While (50) shows that the non marked position of the object is before the verb *want*, the contrast of (51) and (52) vs. (53) shows that complement clauses cannot remain in their basic position.

(50) PAOLO APPLE WANT
'Paolo wants an apple'

_____te
(51) PAOLO WANT MARIA HOUSE POSS SELL

_____te
(52) MARIA HOUSE SELL PAOLO WANT

(53) *PAOLO MARIA HOUSE POSS SELL WANT
'Paolo wants Maria to sell her house'

If we assume that PE-clauses are extraposed then we can account for their position and the position of complement clauses with one and only hypothesis: that for some reason, perhaps due to a general (cognitive?) ban against central embedding, any embedded clausal structure needs to be marginalized in LIS[20]. Notice that when complement clauses are extraposed, they are marked as predicted by the marking associated with the PE-clause and with extraposed constituents in general, i.e. 'tensed eyes'. The only residual peculiarity of PE-clauses in this framework is that they tend to dislocate to the left and less to the right, for some reason to be investigated.

A different kind of evidence for the extraposed status of the PE-clause concerns reconstruction. Consider (54).

rel
(54) ONE WOMAN$_i$ MAKE-UP NOT PE$_i$ IX MEET NEVER
'I never met any woman who doesn't wear make-up'

As the translation makes clear, the PE-clause falls under the scope of matrix negation, which however does not superficially sit in a c-commanding position. This suggests that the PE-clause gets reconstructed for interpretation in a position internal to the main clause, that of the correlate. This is exactly what is predicted under the extraposition analysis, where the PE-clause gets merged in that very position. In a similar way, in (55) the quantifier NOBODY in the matrix clause binds the possessive pronoun occurring at its left, within the relative CP.

_____rel
(55) PROFESSOR$_i$ POSS$_i$ COMPUTER$_k$ BUY PE$_k$ STUDENTS STEAL NOBODY

[20] See Geraci, Gozzi, Papagno, Cecchetto 2006 for an interesting hypothesis connecting this avoidance of center embedding in sign languages to the documented lower short term memory performance displayed by signers. Of course, this kind of processing trigger for clausal extraposition is not extraneous to spoken languages as well, as is well known for German and other OV languages. As for relativization, notice that Liptak 2005 derives the left adjoined status of Hungarian correlative clauses from the same kind of processing strategy.

'No student steals the computer that his professor bought'

A final piece of evidence pointing toward the extraposition of the PE-clause is illustrated in the following examples. While in (56) the PE-clause can be reconstructed in a position internal to the main clause crossing a simple clause boundary, *I know*, in (57) the relative clause *the teacher who gave a price* is an island blocking reconstruction of the relative clause *the child who wins*. This sensitivity to islands is a clear evidence for movement of the PE-clause.

(56) [CHILD$_i$ WIN PE$_i$] [IX KNOW TEACHER PRICE ~~CHILD WIN PE~~ GIVE]
rel
I know that the teacher gave a price to the child who won'

(57) *[CHILD$_i$ WIN PE$_i$] [TEACHER$_k$ PRICE ~~CHILD WIN PE~~ GIVE PE$_k$] [IX KNOW]
rel rel
'I know the teacher that gave a price to the child who won'

We can conclude from this brief survey that we have good reasons to believe that the PE-clause is extraposed. Notice however that the extraposed status of the clause is not necessarily an argument against a correlative analysis: Bhatt 2003 argues convincingly that Hindi correlative structures are not base generated in their left adjoined position, but rather moved there from a position internal to the main clause. If this were a general fact about correlatives, then the distance between correlative structures and extraposed internally headed relative clauses would be significantly reduced[21].

4.5. Concluding remarks

Before concluding this section and turning to a full-fledged analysis incorporating its results, there is a final data which is worth mentioning as it seems to go against a correlative analysis. PE-clauses can stack, as illustrated in (58).

(58) VASE$_i$ SEE DONE PE$_i$ TODAY BUY PE$_i$ EXPENSIVE[22]
rel
'The vase that I saw that I bought today is expensive'

Stacking is a general property of relative clauses: the translation provided for (58) is an example of a stacking relative in English. On the other hand, the impossibility of stacking is reported as a typical property of correlatives (Dayal 1991, Bhatt 2003, Mc Cawley 2004, a.o.).

In this section we have discussed a number of data pointing towards the nominal status of the PE-clause (§4.2), the trace status of the correlate (§4.3), and the extraposed status of the PE-clause (§4.4). As we have seen at the beginning of the section these are the crucial properties allowing us to discard a correlative analysis, such as the one illustrated in §4.1. In the next section, we shall turn to the alternative analysis, identifying the PE-clause with an extraposed internally headed relative clause.

5. An extraposed internally headed relative clause analysis

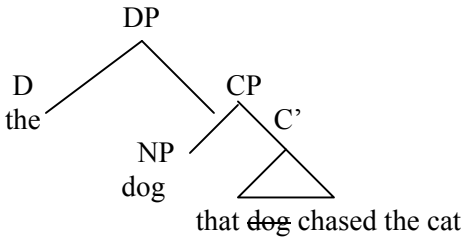
Suppose that relatives are defined by two crucial properties: a) they are clausal structures endowed with D-like features (they are so-called 'complex nominal phrases' in GB terms); b) they involve a

[21] See Cable (this volume) for similar conclusions on correlatives in Tibetan.

[22] That what we have here is really two stacked PE-clauses, and not simply two conjoined PE-clauses referring to the same antecedent (roughly corresponding to *The vase that I saw and that I bought is expensive)* is confirmed by looking at the context of utterance: in the context provided for (58) a number of vases that I saw were available. (58) was meant to pick up among them the one I bought.

dependency between two (nominal)[23] positions: one internal to the clause itself, and one external to it, corresponding to the position where the clause is interpreted. To illustrate, this is the spirit of the so-called 'raising analysis' proposed by Kayne 1994 and developed in Bianchi 1999 for externally headed relative clauses: see the English example in (59).

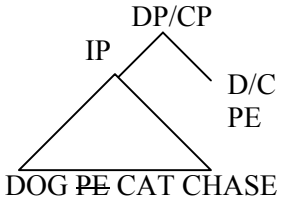
(59) The dog that chased the cat (came home).



In (59) the two properties a) and b) above are realized through two different items: the D-like feature of the clause is provided through merging an external D head; the dependency is given by the movement of an NP to a position external to the clause from a position internal to it.

Notice however that there is nothing intrinsic in the definition of relative clauses that requires the two properties a) and b) to be realized through the activation of two distinct elements. This observation is crucial to understand what goes on in LIS PE-clauses. The idea is that the two properties are carried out by the simple movement of one and only element: PE. Consider the structure in (60) to clarify.

(60)



In (60) the determiner PE moves to a peripheral position (C°) from an internal position. In doing so, PE realizes property (b) establishing a dependency between two positions just as *woman* does in (59). The only difference is that this dependency is achieved through head movement in (60), and through phrase movement in (59). Being a determiner sitting in the head position of the clause, PE furthermore endows it with the required D-like feature (property a). The difference with (59) is simply that the D head nominalyzing the clause is *moved* in (60), while it is *merged* in (59). The notation given in (60), where a double status is assigned to the very same head and its projection is meant to signal precisely this: that the head C of the clause acquires derivationally the status of a head D (projecting a DP) by hosting the head PE moved there through head movement.[24]

Remember that PE can also be signed in its base position next to the NP it usually strands (at least for some signers). See (41) repeated here as (61).

(61) rel
CHILD PE COMPETITION WIN TEACHER PRIZE GIVE
'The teacher gives a prize to the child who has won the competition'

[23] While core cases of relative clauses involve nominal positions, there are a number of adverbial relative clauses attested crosslinguistically. A familiar example is that of *ever-* free relatives in English, as in (i).
(i) I will eat however much you will.
Thanks to Anikò Lipták for reminding this to us.

[24] See Chomsky 2004, Donati 2006, Cecchetto and Donati in press for a discussion of this 'projection property' of head (movement).

Cases like (61) provide an important evidence for the derivative status of the external position of PE, which is a crucial aspect of our analysis. Presumably, in cases like (61) the PE-clause receives its relative properties through the covert movement of PE.

This way of interpreting relativization can be usefully extended to structures apparently not related to the peculiar construction of a sign language. Consider the following data, corresponding to relative clauses in Japanese, Diegueño, Quechua, Tibetan, respectively.

(62) Yoko-wa [[Taro-ga sara-no ue-ni keeki-o iota]-**no**] -o tabeta
Yoko-TOP Taro-NOM plate-GE on-LOC cake-ACC put **NML** ACC ate
'Yoko ate a cake which Taro put on the plate'
(Japanese: Shimoyama 1999: 147)[25]

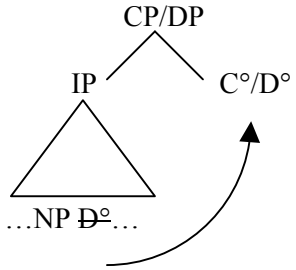
(63) [Tenay ?ewa:ø ?ewu:w]-**pu**] -L^{y} ?ciyawx
Yesterday house-ACC I-saw **DEF**-in I-will-sing
'I will sing in the house that I saw yesterday'
(Diegueño: Keenan 1985:162)

(64) [[Kan kwitsa-man kwintu-ta willa]-**shka**]-ka llapa sumaj-mi
you girl-to story-ACC tell **NML** TOP very pretty-VALIDATOR
'the girl to whom you told the story is very pretty'
(Quechua: Comrie 1981:139)[26]

(65) [[Peemɛ thep khii-pa] **the**] nee yin
Peem-ERG book-ABS carry-PART **the**-ABS I-GEN be
'The book Peem carried is mine'
(Tibetan: Keenan 1985:161)[27]

These sentences have a lot in common: they all belong to head final languages; they all involve internally headed relative clauses (within brackets); they all display a determiner-like element (either in the form of a nominalizer morpheme or in that of a free determiner) at the right edge of the relative clause. We can account straightforwardly for these three facts if we extend the analysis proposed above (60) for LIS to these structures: they might all realize the defining relativization properties a) and b) by moving a determiner head to the C position of the clause.

(66)



While our knowledge of relativization strategies in most of the languages cited above is purely anecdotic, and we do not have any evidence that the nominalizers actually move, something can be said, although very briefly, for Japanese. Notice in fact that besides relative clauses, the determiner-like element

[25] Notice that Shimoyama 1999 provides a different translation for the example given, making explicit its non restrictive status. Being irrelevant here, we preferred to give a more transparent translation See section 6 for a discussion of these interpretive facts.
[26] Actually the clause is ambiguous, as signaled by Comrie: it can also mean 'the story you told the girl is very pretty'.
[27] Notice that a different construction, arguably correlative, is discussed by Cable (this volume) for Tibetan.

–no shares with PE the same general distribution: they both occur in a number of contexts in which they carry out the same function, that of nominalizers. The following data in Japanese[28] perfectly overlap with the data concerning the distribution of PE presented in section 4.2.

(67) a. Akai-no
red-NML
'The red one'
b. saisho-no
first-NML
'The first one'
c. watashi-no
I-NML
'Mine'
d. chishai-no
little-NML
'The little one'

The data above, which we cannot discuss here in detail for obvious reasons of space, suggest that a similar derivation for relative clauses involving PE and –no is sounded.

Before concluding, it is worth pointing out an important advantage of the analysis presented. As already pointed out above, in (59) and (60) the same function of connecting two nominal positions (property b of relativization) is carried out by two different elements: a nominal phrase in externally headed relative clauses, a determiner head in internally headed relative clauses. This implies that the two types of relatives do not share the same LF representation. This is very different from more standard analyses reducing internally headed relatives to externally headed relatives: by assuming that the antecedent NP moves covertly at LF, they imply that the two types of relatives share the same LF representation (see Ito 1986 for Japanese, Broadwell 1986 for Choctaw, Cole 1987 for Ancash and Imbabura Quechua, Lefebvre and Muysken 1988 for Quechua, Watanabe 1992 for Japanese a.o).

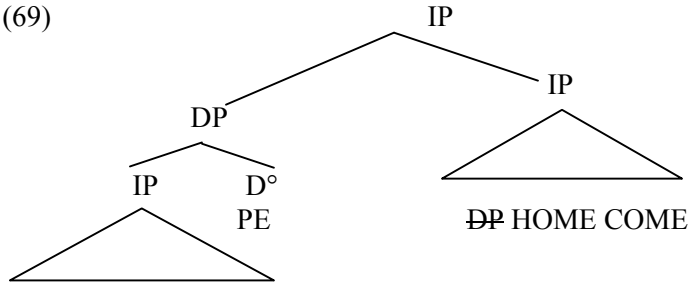
Shimoyama 1999 shows in Japanese that the two types of relatives, both attested, display important interpretive differences and that in particular the antecedent NP is never externalized in internally headed relatives. This is exactly what is predicted given the two structural hypotheses in (59) and (60). Section 6 will be devoted to discussing in more detail some interpretive properties of LIS PE-clauses together with Shimoyama's observations.

Finally, while (60) provides an analysis for the internal structure of the PE-clause and its nominal status, we have not yet accounted for its extraposed position. As any relative clause, the PE-clause originates within the main clause in the position where it is interpreted. As any embedded clause in LIS, it is extraposed[29]. We will not characterize any further the left peripheric position it occupies, in lack of a fine-grained cartography of the left periphery in LIS. The diagram in (69) provides an illustration of the overall structure of a sentence like (68).

(68) $\underline{\text{DOG}_i \text{ CAT CHASE PE}_i}^{\text{rel}}$ HOME COME
'The dog that chased the cat came home'

[28] These data were provided to us by Karine Arnéodo, whom we thank.
[29] See §4.4 above for details.

(69)



DOG ~~PE~~ CAT CHASE

We can conclude from this section that PE-clauses seem to naturally fit within a typology of relativization well attested across a number of unrelated (spoken) languages.

As for sign languages, the structure in (69) presents interesting analogies with ASL internally headed relative clauses as described in a classical paper by Liddell 1978 and illustrated by the sentence in (70)[30].

(70) RECENTLY DOG THAT CHASE CAT COME HOME
r
'The dog that recently chased the cat came home'

More specifically, (70) shares with PE-clauses the following properties:
- a specific NMM identifying the relative;
- a demonstrative-like element glossed THAT in (70) coferent with the antecedent;
- a strong preference for a sentence initial position.

More investigation is needed to verify whether these superficial analogies are derivable from a common analysis along the lines of the hypothesis proposed here. We refer the reader to Pfau and Steinbach 2005 for a first typological survey of relativization strategies in world sign languages.

6. Restrictive or appositive?

There is still an issue to be discussed, only partially related to the conclusions about the structure of the PE-clause reached above. Cecchetto et al. 2006 argue for the non restrictive interpretation of PE-clauses on the basis of two facts. Let us briefly illustrate them and verify whether their conclusion is to be maintained.

6.1. Apparent reversability

The first fact discussed by Cecchetto et al. concerns the alleged 'reversability' of the sentences containing the PE-clause. They observe that their informants, when asked to translate an Italian sentence corresponding to (71), spontaneously produce two reversed constructions, those in (72a-b), which are thus claimed to be equivalent.

(71) Maria kissed a boy that left

(72) a. MARIA BOY_i KISS PE_i LEAVE DONE
'A/the boy that Maria kissed left

b. BOY_i LEAVE DONE PE_i MARIA KISS

[30] Actually ASL differs from LIS in that it displays an externally headed strategy together with the internally headed one discussed here. (i) provides an illustration from Liddell 1978.

(i) ASK GIVE DOG URSULA KICK THAT
r nod
'I asked him to give me the dog that Ursula kicked'

'Maria kissed a/the boy that left'

In English restrictive relative clauses, such equivalence does not hold, since the two 'reversed' sentences clearly carry different presuppositions. See (73a) and (73b) below.

(73) a. Mary kissed the boy that left
b. The boy that Mary kissed left

(73a) presupposes that there is only one boy such that he left; (73b) presupposes that there is only one boy such that Mary kissed him. In contrast, the equivalence of the pair in (72) is reminiscent of what holds for English appositive relative clauses, as illustrated in (74).

(74) a. Mary kissed the boy, who left
b. The boy, who Mary kissed, left

The similarity between the LIS pair in (72) and the two English appositive relative clauses in (74) is striking at first sight, and interpreted by Cecchetto et al. as suggesting that LIS PE-clauses are appositive as well. However, this conclusion does not resist a deeper investigation. More precisely, such similarity breaks down as soon as a context of utterance is provided. When trying to reduplicate with our informants the results of Cecchetto et al., we found out that the 'reversed' PE-clauses in (72a-b) are selected by different contexts. More precisely, (72a) is the only felicitous answer to the question: 'Who left?', while (72b) answers a question like: 'Who did Mary kiss?'. This context sensitivity clearly shows that the two sentences *can* indeed carry two different presuppositions, just as the English restrictive relative clauses in (73) do. On the other hand, nothing alike happens with the pair of English appositive relative clauses in (74), whose equivalence remains in any given context.

When no context is provided, the equivalence of the two 'reversed' sentences in (72) observed by Cecchetto et al. might be due to a different factor, concerning the ambiguity of the antecedent in LIS. Recall that LIS has no overt means to distinguish definite and indefinite NPs. It follows that any relative antecedent in LIS is ambiguous between a definite reading like the reading of (73a-b), which are not equivalent at all, and an indefinite reading like the one of (75a-b), which are indeed reversible.

(75) a. Mary kissed a boy that left
b. A boy that Mary kissed left

Here the equivalence in presupposition of the two sentences is not due to the status of the relative clause (which is restrictive), but to the indefiniteness of its antecedent. The same is likely to hold in LIS in any case (when no context is provided), being any antecedent systematically ambiguous with respect to its definiteness.

Resuming so far, the (limited) equivalence of (72a) and (72b) does not provide any evidence for the non restrictive status of PE-clauses.

6.2. An unexpected entailment

The second fact discussed by Cecchetto et al concerns the interaction of PE-clauses with universal quantifiers. They observe that while ALL is compatible with the PE-clause, it yields an unexpected interpretation, in which the domain of the quantifier is not restricted by the PE-clause: more precisely, (76) entails surprisingly that all the boys left and all called. Compare this interpretation with that of the English sentence (77) where no such entailment holds and the domain of the quantifier is restricted by the relative clause.

(76) ALL $BOYS_i$ LEAVE PE_i IX_i CALL

(77) All the boys that left called

Cecchetto et al. qualify the LIS interpretation as typically appositive, since it is typically displayed in English by non restrictive relative clauses, as (78).

(78) All the boys, who left, called.

We think however that the interpretation of ALL in (76) does not necessarily force the conclusion that PE-clauses are appositive.

Remember that under the analysis we have adopted (see (69) above), no NP is ever externalized from the PE-clause at any level of representation. This is a crucial feature setting apart internally headed relative clauses from externally headed relative clauses. Suppose quantifiers need to be merged with an NP. This means that when ALL is signed next to the antecedent, it is internal to the relative clause in LIS (76) (being the relative internally headed) but external to the relative clause in English (77) (being the relative externally headed). In this view the entailment observed in LIS would be a consequence of the fact that ALL is internal to the relative clause. Indeed, the very same entailment holds in English when *all* is stranded in the base position of the antecedent: consider (79).

(79) ?The boys that all left called

Although marginal, the relative clause in (79) clearly entails that all the students left and all the students called. Notice that (79) contrasts with (77) only in that *all* sits within the relative clause in the former but not in the latter.

Japanese provides independent evidence that we might be on the right track claiming that what is really relevant for the interpretation of quantifiers is the position of the antecedent: internal or external to the relative clause. Shimoyama (1999:149-150) discusses a minimal pair reported in (80): (80a) is an internally headed relative clause; (80b) is a minimally different externally headed relative clause.

(80) a. Taro-wa [[Yoko-ga reezooko-ni **kukkii-o**
Taro-Top Yoko-Nom fridge-Loc cookie-Acc
hotondo irete-oita]-no]-o paatii-ni motte itta.
most put-Aux NM-Acc party-to brought
'Yoko put most cookies in the refrigerator and Taro brought them to the party.'

b. Taro-wa [[Yoko-ga reezooko-ni ∅irete-oita]
Taro-Top Yoko-Nom fridge-Loc put-Aux
kukkii-o **hotondo**] paatii-ni motte itta
cookie-Acc most party-to brought
'Taro brought most cookies that Yoko had put in the refrigerator to the party.'

The difference in interpretation informally indicated in the translations provided by Shimoyama himself is strikingly reminiscent of the contrast between LIS and English discussed above (76-77). Quoting Shimoyama, "the two sentences do not share truth conditions (…) The translation for <(80b)> shows that the relative clause 'Yoko put x in the refrigerator' constitutes the restriction for the domain of 'most' along with 'cookies', whereas the translation for <(80a)> shows that the domain of 'most' is restricted only by 'cookies', but not by the rest of the relative-clause 'Yoko put x in the refrigerator'."

If we assume that the quantifier needs to be merged with the antecedent, we can account for all these data in a unified way: in internally headed relative clauses, the quantifier is internal to the clause and therefore unrestricted in its domain (80a, 76); the same interpretation holds in sentence (79), an English externally headed relative in which the quantifier is stranded within the clause. The other reading, where the relative clause restricts the domain of the quantifier, can only be obtained in externally head relative clauses, with the quantifier merged with the external antecedent: (77, 80b). [31]

[31] This cannot be all the story. Recall that both in LIS and in English (and in Japanese?), quantifiers can appear floating in the main clause (see section 4.3). The interpretation is then invariably the same: one in which the quantifier is restricted in its domain by the relative.

(i) a. $BOYS_i$ EXAM DONE PE_i TODAY ALL PASS DONE
'All the boys that took the exam today passed'

If we are on the right track, then the data discussed by Cecchetto et al. cannot force *per se* the conclusion that PE-clauses are non restrictive.

6.3 Testing the status of PE-clauses

When providing a context for the interpretation of the data we elicited, we had the strong suspect PE-clauses to be restrictive. We therefore tested the clauses for a set of properties standardly associated with restrictivity, using them as a tentative diagnostic for their status. As we shall see, it is a set of very heterogeneous properties, some clearly highlighting a syntactic definition of restrictivity, other pointing to more interpretive characteristics, which simply appear to operatively single out restrictives from appositives in many languages. Their tested crosslinguistic validity as a diagnostic (see Del Gobbo 2003 for a similar procedure on Chinese relatives) encouraged us in trying to apply them to LIS. Although they are standardly meant to be diagnostics for restrictivity in externally headed relative clauses, we tentatively tried to extend their scope to LIS internally headed relative clauses, and see whether this would yield a consistent picture.

For each property discussed, we shall first briefly define it, then illustrate it with an English example and finally provide the corresponding LIS sentence we elicited from our informants.

1. Sentential adverbs

While sentential adverbs of modification can appear inside non restrictive relative clauses (81a), they cannot appear inside restrictive relative clauses (81b): Ogle 1974.

(81) a. The boys, who have by the way lost the case, should give up
b. *The boys who have by the way lost the case should give up

As (82) shows, no sentential adverb can appear in a LIS PE-clause.

(82) *WOMAN$_i$ MAN BY-THE-WAY KISS PE$_i$ PASTA MAKE CAN (rel)
*'The woman that by the way kissed the man can make pasta'

2. Pronominal head

While non restrictive relative clauses can modify pronouns (83a), restrictive relative clauses may not (83b).

(83) a. We, who are women, think that you, who are men, should go now
b. *We who are women think that you who are men should go now

The ungrammaticality of (84) shows that a pronoun (i.e. an indexical: IX) cannot be the antecedent of a PE-clause.

(84) *YESTERDAY IX$_i$ FELL-OFF BIKE PE$_i$ TODAY NEW GLASSES BUY WANT (rel)
*'You that yesterday fell off the bike today want to buy new glasses'

3. Matrix negation

While an NP modified by a restrictive relative clause can be within the scope of matrix negation (85b), a nonrestrictive relative clause cannot (85a): Dermidache 1991.

(85) a. *I haven't met a girl, who doesn't like to wear make-up
b. I haven't met a girl who doesn't like to wear make-up

---

b. The boys that took the exam all passed

While this interpretation is not surprising for English, this fact is puzzling for LIS at the light of what we claim here.

A relevant sentence was already discussed above in section 4.3, as a piece of evidence for the extraposed status of the PE-clause: (86) repeats it, and its interpretation shows that that PE-clause is in the scope of the matrix negation.

(86) ONE WOMAN$_i$ MAKE-UP NOT PE$_i$ IX MEET NEVER (rel)
'I never met any woman who doesn't wear make-up'

4. Stacking

While restrictive relative clauses can stack (87b), non restrictive relative clauses cannot (87a): McCawley 1988.

(87) a. #The tiger, which was 5 weeks old, which was fed twice a day, ate only fish[32]
b. The tiger that I saw that I wanted to buy was expensive

Stacking as well was already discussed here, as an evidence against a correlative analysis for PE clauses: see (58) above repeated here as (88).

(88) VASE$_i$ SEE DONE PE$_i$ TODAY I BUY PE$_i$ EXPENSIVE (rel)
'The vase that I saw that I bought today is expensive'

5. Proper name head

While nonrestrictive relative clauses can be used to qualify unmodified proper names (89a), restrictive relative clauses cannot (89b).

(89) a. John, who you saw yesterday, is a good friend
b. *John who you saw yesterday is a good friend

As the contrast in (90) shows, a PE-clause is incompatible with a proper noun antecedent. The only way to have a sentence modifying a proper name is by omitting both PE and the non manual marking 'rel'.

(90) a.*MARIA$_i$ CAKE COOK LIKE PE$_i$ PREPARE DONE (rel)
'Maria who likes to cook cakes has prepared one'
b. MARIA CAKE COOK LIKE PREPARE DONE
'Maria, who likes to cook cakes, prepared one'

Whether the sentence in (90b) is some kind of an appositive relative or a simple coordination we do not know. Interestingly enough, it was produced by our informants in a context meant to elicit a relative clause.

6. Ordinal head

An ordinal preceding the antecedent of a restrictive relative clause is restricted in its domain by the relative clause, (91b) while an ordinal preceding the antecedent of a nonrestrictive relative clause is only restricted in its domain by the antecedent (91a).

(91) a. The first woman, whom I kissed, works in a bank.
b. The first woman that I kissed works in a bank.

[32] Notice that by stacking we mean a relative clause modifying another relative clause modifying an antecedent, not just two conjoined relative clauses modifying the same antecedent (which is possible with non restrictive relative clauses as well).

The relevant data in LIS, which was discussed in details in section 4.2, is repeated here:

(92) FIRST WOMAN$_i$ KISS$_i$ PE$_i$ NOW BANK WORK
rel
The first woman I kissed now works in a bank'

In the LIS sentence in (92), just like in the restrictive relative in (91b) but unlike the non restrictive relative clause (91a), the ordinal does not just refer to woman, but rather to the first woman I kissed.

7. Intentional verbs

While restrictive relatives are in the scope of intentional verbs (93b), nonrestrictive relatives are not (93a): Zhang 2001.

(93) a. #Gianni thinks that Mary likes the men, who own big cars
b. Gianni thinks that Mary likes the men who own big cars

The interpretation of (94) corresponds to that of (93b): the PE-clause is in the scope of *think*.

(94) GIANNI THINK MEN$_i$ CAR cl.BIG-CAR PE$_i$ MARIA LIKE[33]
rel
'Gianni thinks that Maria likes men that own big cars'.

8. Ellipsis

While the antecedent of a VP ellipsis may include a restrictive relative clause (95b), it may not include a non restrictive one (95a).

(95) a. My sister likes pizza, which by the way I cook well, and my brother does not (= like pizza)
b. My sister likes the cakes I bake, and my brother does not (= like the cakes I bake)

The interpretation of (96) shows that what gets reconstructed in the second conjunct includes the PE-clause.

(96) CAKE$_i$ IX$_i$ IX COOK PE$_i$ SISTER POSS LIKE BROTHER POSS NOT
rel rb
'My sister likes the cake that I bake, my brother does not (= like the cake that I bake)'

9. Summarizing

Other standard diagnostics were not included in the testing because not extendable to LIS for independent reasons. For example, a useful diagnostics singling out appositive clauses in English is heavy pied-piping: see the contrast in (97).

(97) a. The windows, the curtains of which I really dislike, are very wide.
b. *The windows the curtains of which I really dislike are very wide.

It is clear that a category such as pied-piping plays no role in PE-clauses, where the antecedent does not move at all.

The following table summarizes for each property the behavior of restrictive and non restrictive relatives in English and that of LIS PE-clauses.

[33] The sentence in (94) is the only case we found where the PE-clause does not occur sentence-initially. Notice however that it is not a counterexample to the generalization according to which PE-clauses are always left-extraposed (see §4.4): here it is indeed at the left periphery of the clause it belongs to, which happens to be embedded under the matrix intentional verb, and thus (rightward) extraposed.

property	restrictive	appositive	LIS RC
1. sentential adverbs	NO	YES	NO
2. pronominal head	NO	YES	NO
3. matrix negation	YES	NO	YES
4. stacking	YES	NO	YES
5. proper name head	NO	YES	NO
6. ordinal head	YES	NO	YES
7. intentional Verbs	YES	NO	YES
8. ellipsis reconstruction	YES	NO	YES

The phenomena enlisted, although at a first descriptive level, give us a very clear and consistent picture: they all homogeneously point at the restrictive nature of LIS PE clauses.

7. Conclusions

In this paper we have analyzed in detail the construction functionally dedicated to express relativization in Italian Sign language, a biclausal sentence containing what we have labeled a PE-clause out of the sign PE closing it, followed by a main clause. Starting from the important descriptive results of the first pioneering study on these structures in LIS (Cecchetto et al. 2006), we have compared different analyses, which appeared to be compatible with the relevant data: one identifying the structure with a correlative construction, as argued in Cecchetto et al. 2006; one in which the PE-clause is analyzed as an internally headed relative clause extraposed sentence initially. At first sight, both analyses appear to be compatible with the LIS data. However, a closer examination has revealed the extraposed internally headed analysis to be more adequate. From the evidence discussed we rejected the correlative analysis by concluding that PE-clauses are relatives in that they have a nominal status; they are extraposed in the left periphery from the main clause position where they are interpreted; they leave a trace in such a position optionally spelled out by a resumptive pronoun.

More precisely, relying on the observation that PE is a determiner-like element and that its position at the end of the relative clause is derived, we claimed that the relative status of the clause is accomplished by head moving PE to C: being a head, PE moved in C projects, endowing the clause with the D-like feature necessary for its nominal distribution. By connecting an internal position (that of the antecedent) to the external of the clause, it triggers the interpretation of the sentence as a relative. Under this analysis the conclusion that PE-clauses are relatives does not imply that they share the same LF representation as externally headed relative clauses: this important corollary is discussed in some detail. The final section is dedicated to verify whether the distinction restrictive/non restrictive is nevertheless relevant for PE-clauses: the conclusion is that they behave in all the properties tested as restrictive relative clauses

Acknowlegments

This paper would have never existed without the unvaluable collaboration of our informants, whom we dearly thank: Corrado D'Aversa, who also accepted his recordings to be available online; Remo and Romolo Leonori; Fiorella and Pantelis Yacommidakis. Thanks are also due to all the members of the deaf community of Ancona, and especially to the president of the ENS of Ancona Adalberto Nisi and the interpreter Marzia Branchini. For their kind hospitality in Rome, we also thank the ENS of Rome and the SILIS group. We would also like to express our gratitude to Alessandra Brezzi for valuable discussion on

Chinese and Japanese relative clauses and to Karine Arnéodo who provided the Japanese data. Earlier versions of this paper were presented at SIGNA VOLANT in Milan, GLOW Asia in Delhi, Urbino graduate seminar and IGG in Florence: we thank the audiences for their precious questions and comments. In particular, we benefitted a lot from discussing with Carlo Cecchetto, Carlo Geraci, Sandro Zucchi in Milan, and Michela Ippolito, Robert Lee, Carol Neidle, Michael Schlang in Boston. We finally need to thank two anonymous reviewers, Anikò Liptàk and Carlo Cecchetto, who read an earlier version and helped improving it with their comments. Technical supplies for video recordings were financed through a Grant to Branchini by Regione Marche, Assessorato ai Servizi Sociali, and by the University of Urbino.

References

Aarons, D., 1994. Aspects of the syntax of American Sign Language. Doctoral dissertation, Boston University.

Bahan, B., 1996. Non-manual realization of agreement in American Sign Language. Doctoral dissertation, Boston University.

Bhatt, R., 2003. Locality in correlatives. Natural Language and Linguistic Theory. 21, 485-541.

Bianchi, V., 1999. Consequences of Antisymmetry: Headed relative clauses. Mouton de Gruyter, Berlin..

Branchini, C., 2007. Relatives and related constructions in LIS. Doctoral dissertation, Università di Urbino.

Broadwell, G. A., 1986. A-bar Anaphora and Relative Clauses. In: S. Berman, S., Choe, J-W., McDonough, J. (Eds.) Proceedings of the 16th Conference of the Northeast Linguistic Society. GSLA, Amherst, MA, pp. 47-56.

Caselli, M. C., Maragna, S., Volterra, V., 2006. Linguaggio e sordità. Il Mulino, Bologna.

Cecchetto, C., Zucchi, S., 2004. Why is Spec, CP on the Right in Sign Languages? Glow Newsletter.

Cecchetto, C., Geraci, C., Zucchi, S., 2006. Strategies of relativization in Italian Sign Language. Natural Language and Linguistic Theory 24, 945-975.

Chomsky, N., 2004. On Phases. Unpublished Ms. MIT. [Available on-line at: http://www.phon.ucl.ac.uk/home/hans/mrg/chomsky_onphases_1204.pdf

Cole, P., 1987. The structure of Internally Headed Relative Clauses. Natural Language and Linguistic Theory 5, 277-302.

Comrie, B., 1981. Language Universals and Linguistic Typology: Syntax and Morphology. University of Chicago Press, Chicago.

Dayal, V. 1996. Locality in WH Quantification: Questions and Relative Clauses in Hindi. Kluwer, Dordrecht.

Del Gobbo, F. 2005. Chinese Relative Clauses: Restrictive, Descriptive or Appositive. In: Munaro, N:, Schweikert, W., Turano, G. (eds.), Contributions to the 30th Incontro di Grammatica Generativa. Libreria Editrice Cafoscarina, Venezia.

Dermidache, H., 1991. Resumptive Chains in Restrictive Relatives, Appositives and Dislocation Structures. Doctoral dissertation, MIT.

Donati, C., 2006. On Wh-head-movement. In: Cheng, L., Corver, N. (Eds.), Wh-movement on the Move. MIT Press, Cambridge, MA, pp. 21-46.

Downing,, B., 1973. Correlative relative clauses in universal grammar. Minnesota Working Papers in Linguistics and Philosophy of Language 2, 1-17.

Emonds, J., 1979. Appositive Relatives have no Properties. Linguistic Inquiry 10, 211-243.

Franchi, M. L., 2004. Componenti Non Manuali. In: Volterra, V. (Ed.) La Lingua Italiana dei Segni. Il Mulino, Bologna, 159-178.

Geraci, C., 2004. L'ordine delle parole nella LIS. In: Albano Leoni, F. et al. (Eds), Parlato italiano, Atti del convegno nazionale di Napoli. D'Auria Editore, Napoli.

Geraci, C., 2006. Negation in Italian Sign Language (LIS). In: Bateman, L., Ussery, C. (Eds.), Proceedings of the North East Linguistic Society 35, GLSA, Amherst, MA.

Geraci, C., Gozzi, M., Papagno, C., Carlo C.,. 2006. How Grammar Can Cope with Limited Short Term Memory: Simultaneity and Seriality in Sign Languages. Unpublished Manuscript. Università di Milano Bicocca.

Geraci, C., 2006. Sign Languages: A puzzle for Successive Cyclic Linearization?. In: Davis, C. , Deal, A.R., Zabbal, Y. (Eds.) Proceedings of the 36th annual meeting of the North East Linguistics Society. GSLA, Amherst, MA.
Grosu, J., 2002. Strange relatives at the interface of two millennia. Glot International 6, 145-167.
Ito, J., 1986. Head-Movement at LF and PF. University of Massachusetts Occasional Papers in Linguistics 11, 109-138.
Jackendoff, R., 1977. X' Syntax: A study of Phrase Structure. The MIT Press, Cambridge, MA.
Kayne, R., 1994. The Antisymmetry of Syntax The MIT Press, Cambridge, MA.
Keenan, E. L., 1985. Relative Clauses, In: Shopen, T. (Ed., Language Typology and Syntactic Description II: Complex Constructions. Cambridge University Press, Cambridge, MA, pp. 141-170.
Lefebvre, C., Muysken. P., 1988. Mixed Categories: Nominalizations in Quechua, Kluwer, Dordrecht.
Liptàk, A., 2005. Correlative Topicalization. Unpublished Manuscript, ULCL, Leiden University.
McCawley, J. D., 1988. The syntactic phenomena of English, Chicago University Press, Chicago.
McCawley, J. D., 2004. Remarks on Adsentential, Adnominal, and Extraposed Relative Clauses in Hindi. In: Dayal, V. Mahajan, A. (Eds.) Clause Structure in South Asian Languages Kluwer, Dordrecht.
Neidle, C. Kegl, J., Bahan, B, Aarons, D., MacLaughlin, D., 1997. Rightward Wh-Movement in American Sign Language. In: Beerman, D., LeBlanc, D., van Riemsdijk, H. (Eds.) Rightward Movement. John Benjamins, Amsterdam, pp. 247-278.
Neidle, C., Kegl J., MacLaughlin, D., Bahan, B. and Lee, R., 2000. The Syntax of American Sign Language. The MIT Press, Cambridge, MA.
Neidle, C., Sclaroff, S. Athitsos, V., 2001. Sign Stream™: A Tool for Linguistic and Computer Vision Research on Visual-Gestural Language Data. Behaviour Research Methods, Instruments and Computers 33, 311-320.
Neidle, C., 2002. Language across modalities: ASL focus and question constructions. In: Pica, P., Rooryck, J. (Eds.) Linguistic Variation Yearbook. John Benjamins, Amsterdam, pp. 71–98.
Nunes, J., Quadros, R., In press. Phonetic Realization of Multiple Copies in American and Brazilian Sign Languages. In: J. Quer (Ed.) Selected Papers of TISLR 8.
Ogle, R., 1974. Natural Order and Dislocated Syntax. Doctoral dissertation. UCLA.
Petronio, K., Lillo Martin, D., 1997. Wh-movement and the Position of Spec, CP: Evidence from American Sign Language. Language 73, 18-57.
Pancheva, R., 1997. The syntax and semantics of correlative proforms. In: Kusumoto, K. (Ed.) Proceedings of NELS 26. GLSA, Amherst, MA, pp. 133-147.
Pfau, R., 2004. Doing it the right way: Wh-movement in Indo-Pakistani sign language. *Talk given at Zentrum fuer Allg Spachwissenschaft*, Typologie & Universalien Forschung, Berlin.
Pfau, R., 2005. Phrasal Layers and Prosodic Spreading in Sign Language. *Signa Volant Workshop* Milan, 2005.
Pfau, R., Steinbach, M., 2005. Relative Clauses in German Sign Language: Extraposition and Reconstruction. In: Bateman L. Ussery C. (Eds.) Proceedings of the North East Linguistic Society 35. GLSA, Amherst, MA, pp. 507- 521
Ross, J., 1967. Constraints on Variables in Syntax. Doctoral dissertation, MIT.
Sells, P., 1985. Restrictive and Non-Restrictive Modification. CSLI Report. Stanford, California.
Shimoyama, J., 1999. Internally Headed Relative Clauses in Japanese and E-type Anaphora. Journal of East Asian Linguistics 8, 147-182.
Sportiche, D., 1988. A Theory of Floating Quantifiers and its Corollaries for Constituent Structure. Linguistic Inquiry 19, 425-449.
Srivastav, V., 1991. Wh. Dependencies in Hindi and the Theory of Grammar. Doctoral Dissertation dissertation, Cornell University.
Volterra, V., 2004. La Lingua Italiana dei Segni. Il Mulino, Bologna.
Watanabe, A., 1992. Wh-in-situ, Subjacency, and Chain Formation. MIT occasional papers in Linguistics 2.
Wilbur, R. Patschke, C., 1999. Syntactic Correlates of Brow Raise in ASL. Sign Language and Linguistics 2, 3-40.
Williamson, J., 1987. An Indefiniteness Restriction for Relative Clauses in Lakhota. In: Reuland, ter Meulen, A. (Eds.) The Representation of (In)definiteness. MIT Press, Cambridge, MA, pp. 168–190.

Zucchi, S., 2003. The Semantics of FATTO: a case of grammaticalization. Paper presented at the 14th Amsterdam Colloquium.