

On resumptive relatives and the theory of LF chains

1. *Introduction**

In various languages, resumptive relativization is a normal strategy alongside "gap" relativization. Recent research on resumptive relatives has concentrated mainly on the distribution of resumptive pronouns along the "NP Accessibility Hierarchy" proposed by Keenan & Comrie (1977). It has been pointed out that cross-linguistically, gap relativization tends to occur in the highest positions of the NP-accessibility hierarchy, whereas resumptive pronouns tend to be obligatory in the lower oblique positions (see Suñer 1998 for a recent general overview).¹ There are however some languages in which the two strategies seem to freely alternate at least in the direct object position.²

In this paper I will argue that the alternation between a gap and a resumptive pronoun is sensitive to a special factor, namely, the type of the relative clauses. I will adopt the three-way typology proposed by Grosu & Landman (1996), which distinguishes non-restrictive, restrictive, and "maximalizing" relatives. On the basis of this typology, I will propose an empirical generalization on the distribution of resumptive pronouns and I will try to derive it from an elaboration of Rizzi's (1997) theory of LF chains.

* The empirical generalization that I present here and the first insight into a possible account of it emerged during my stay at the Universidade Federal de Santa Catarina (Florianópolis) in August 1997. I am indebted to Cristina Figueiredo and Carlos Miotto for inviting me there; I greatly benefitted from the very stimulating environment at UFSC. I also wish to thank many other people both for insightful suggestions and for empirical data: Cecilia Poletto for the Venetian data; Fabrizio and Mario Rota for the Bergamasco data; again, Cristina Figueiredo, Carlos Miotto and their students at UFSC for the Brazilian Portuguese data and for many suggestions; Uri Shlony for the Hebrew data; Vittorio di Tomaso and Barbara Gili for data from the Turin dialect, which unfortunately turned out not to be relevant; Margarita Suñer for the Caracas Spanish data and for much useful discussion; Alex Grosu, for making me acquainted with his and Landman's analysis of relative clause types and for subsequent discussion. Thanks also to the audience at the XXV Incontro di Grammatica Generativa (Siena, February 1999) for various comments. Part of the material was also presented in my 1999 seminar at the Scuola Normale Superiore.

¹ Cinque (1981) argues against the NP Accessibility Hierarchy: He shows that in Italian bare NP adverbials (which are quite low in the hierarchy) pattern with subject and direct object DPs in allowing gap relativization, as opposed to PP adverbials. This suggests that the crucial factor is DP vs. PP relativization.

² Shlony (1992) has argued that this alternation is only apparently free: resumptive pronouns are actually a last resort, and they are realized when the language selects a special [+Agr] complementizer whose Spec qualifies as an A position; movement to this Spec is only possible from the local subject position, whereas movement from any other position is blocked by Relativized Minimality. Thus, resumptive pronouns appear as a last resort in the positions below the local subject whenever the [+Agr] complementizer is selected; they never appear in the highest subject position because in that case the movement derivation converges. One problem with this account is that it requires an evaluation of global economy (see Chomsky 1998: 12 ff., Collins 1997, Johnson & Lappin 1997: 278-313 for relevant discussion). There is also a more technical problem: if resumptive pronouns are included in the initial numeration, and if the numeration is the reference set that identifies the set of alternative derivations that can be compared (Chomsky 1995: 227) then two derivations with movement vs. resumptive pronouns cannot even be compared.

Going back to the initial point, in the following discussion I will keep distinct "optional" resumptive pronouns as in (1) from obligatory resumptive pronouns as in (2), even when they are found in the same language:

- (1) Me fradeo Giorgio, che ti (? o) conossi anche ti, ... (Venetian)
 my brother Giorgio, that you (? him) know you too
- (2) Questo ze un argomento che no voio parlarghe*(ne).
 this is a topic that (I) not want to-talk-to-him-* (about-it)

My analysis will focus on the former; I will go back to obligatory resumption in the concluding section.

The paper is organized as follows. In section 2 I synthetically review Grosu & Landman's (1996) typology of relative clauses; in section 3 I present some comparative data and I propose an empirical generalization on the distribution of resumptive pronouns based on this typology. Sections 4-5 contain the core of my proposal: in section 4 I characterize the three relative clause types in terms of different LF chains; in section 5 I propose that the links in the three chains bear different referential indices, and I argue that in any given language resumptive pronouns are the spell-out of a certain type of referential index. This will account for the observed generalization. In section 6 I discuss some open problems; finally, in section 7 I briefly discuss the status of "intrusive" pronouns.

2. A typology of relative clauses

Relative clauses are traditionally distinguished between non-restrictive and restrictive. The former do not contribute to the determination of the reference of the "head" that they modify, because they fall outside the restrictive term of its determiner:³

- (3) Mary knows few boys, who enjoy knitting Æ Mary knows few boys.

On the contrary, restrictive relatives are included in the restrictive term of the determiner and therefore contribute to determining the denotation of the whole DP:

- (4) Mary knows few boys who enjoy knitting æ/Æ Mary knows few boys.

Syntactically, the difference can be minimally characterized in the following way: Assuming that the restrictive term of a determiner corresponds to its c-command domain in LF, only restrictive relatives, but not non-restrictives, are c-commanded by the determiner of the "head" at LF. Most of the existing analyses incorporate this hypothesis.⁴

A third type of relative clause has been distinguished by Carlson (1977), who called it "amount relative". This type is superficially similar to the restrictive relative, but it is semantically distinct in that the "head" and the relative clause jointly denote not a set of individuals, but a set of amounts (or quantities). This interpretation emerges most clearly in examples like (5), in which the DP modified by the relative denotes an abstract amount and not a concrete quantity of wine: this is the "identity of quantity" reading:

- (5) It will take us three days to drink the wine that John drank that night.

Carlson pointed out that the DP has to denote the *maximal* amount of wine that John drank. This semantic feature is reflected in a peculiar restriction: The "head" of an amount relative can only be introduced by a universal or definite determiner, but not by a weak determiner.

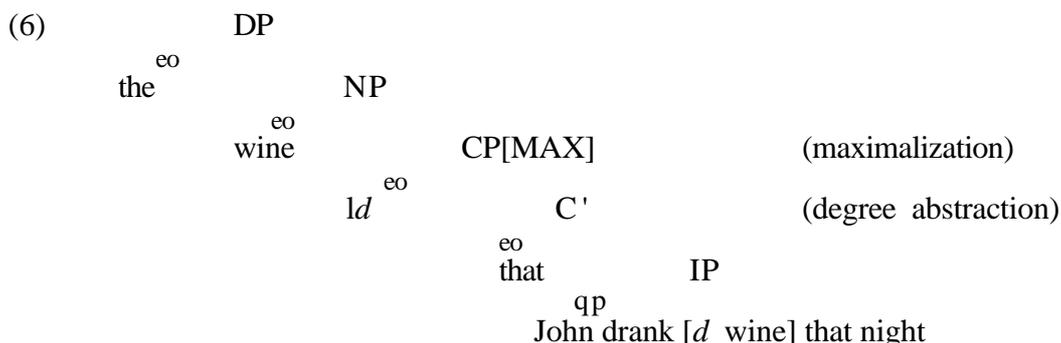
Building on this insight, Grosu & Landman (1996) propose that amount relatives are characterized by two semantic operations: First, the "head" is "reconstructed" within the relative clause and a lambda operator binds a degree variable within it;⁵ second, an operation of

³ Non-restrictive relatives are often assimilated to parenthetical clauses, because they contribute "backgrounded" information about the referentially independent "head" (cf. Emonds 1979 and Safir 1986 for two implementations of this idea).

⁴ See Bianchi (1999: 131-136) for discussion.

⁵ Amount relatives also allow for the "identity of substance" reading, in which the CP denotation is converted from a maximal set of degrees to a maximal set of

maximalization applies at the CP level. As a result, the relative CP denotes the maximal degree/quantity of matter (or individuals) that satisfies the properties described within the CP; the external determiner of the "head" must preserve maximalization. For instance, the LF representation of (5) will be something like (6):



Grosu & Landman (1996) argue that amount relatives actually belong in a wider class of *maximalizing* relatives, which are characterized by the application of maximalization at the CP level. Another member in this class is the free relative, exemplified in (7):

- (7) a. [What you gave to Mary] was an expensive object.
 b. [Whatever you give to Mary] is expensive.

Both in the definite interpretation (7a) and in the universal interpretation (7b), the free relative denotes a maximal set of individuals.

In sum, Grosu & Landman's typology of relative clauses consists of three basic types. In non-restrictive relatives, the "head" is denotationally independent of the relative clause; in restrictive relatives, the "head" and the relative CP denote two sets whose intersection constitutes the restrictive term of the determiner; finally, in maximalizing relatives the "head" is interpreted CP-internally. This synthesis of Grosu & Landman's proposal is very sketchy, but it suffices for our purposes: namely, to identify an important dimension of cross-linguistic variation in the distribution of resumptive pronouns.

3. Resumptive pronouns and relative clause types

Let us consider "optional" resumptive pronouns that alternate with a gap in the subject⁶ and direct object positions. It can be shown that in various languages, their distribution is sensitive to the type of the relative clause. In particular, it is possible to identify three distinct patterns:⁷

(a) In certain Northern Italian dialects like Venetian, Paduan (C. Poletto, p.c.) and Bergamasco, optional resumptive pronouns can only appear in non-restrictive relatives, whereas they are excluded from restrictive and maximalizing relatives:

- (8) a. Me fradeo Giorgio, che ti (? o) conossi anche ti, el ze partio par la merica.
 my brother G., that you (? him) know you too, he has left for America.
 b. El fio che ti_{CL} (*o) ga conossuo ieri el ze meo fradeo.
 the boy that you (*him) have met yesterday he is my brother

individuals. Grosu & Landman actually define the degree function as mapping a plural individual into a triple consisting of the cardinality, the sortal predicate, and plural individual; the third element of the triple is exploited to derive the identity of substance reading. See Grosu & Landman (1996: 22) for details.

⁶ In various languages like Hebrew, Arabic, and Irish, resumptive pronouns are barred from the highest subject position of a relative clause. For alternative analyses of this "highest subject restriction" see McCloskey (1990), Shlonsky (1992) and Demirdache (1997).

⁷ I received the data from informants in the written form in which I am reporting them here. I apologize with the reader for not being able to provide an exact phonetic transcription.

- c. * Me dispiase de tuto el tempo che (**/lo) go perso par gnente.
 me regrets of all the time that [I] (**/it) have wasted for nothing
 d. No ti sa quanti schei che el ze riusio a tirar(**/li) su sto ano.
 not you know ho much money tht he has succeeded in earning (**/it) this year
 e. Go ciamà chi che ti me gavevi domandà de ciamar(*lo).
 [I] have called who that you me had asked to call (*him).

(Venetian)

- (9) a. 'Stó estìt che, che a' m' l'à prestàt mé sorèla, al ma sta benisem.
 this dress here, that CL to-me it has lended my sister, it me suits very well
 b. Ol liber che (?? l') ìe lassàt che söl tàol l'é sparìt.
 the book that [I] (?? it) had left here on the table it has disappeared
 c. Al ma dispiàs de töt ol tép che (?? l')ó perdìt.
 CL me regrets of all the time that [I] (?? it) have wasted
 d. Tó imaginèt gnàc i solcc che i à guadagnàt ist'ann!
 you imagine not even the money that they have earned this year
 e. O avertìt chi (che) düsie averti(* l).
 [I] have advised whom (that) [I] had to advise (* him)

(Bergamasco)

(b) In Hebrew and Brazilian Portuguese, resumptive pronouns are allowed both in non-restrictive and in restrictive relatives, but not in maximalizing ones:⁸

- (10) a. 'ha-bendod' sel-i, 'se rina 'ohevet 'oto, haya baxurnexmad.
 the-cousin of-mine, that Rina loves him, was guy nice
 b. ha-'i's 'se rina 'ohevet 'oto haya ha-bendod' sel-i.
 the-man that Rina loves him was the-cousin of-mine
 c. 'animicta 'er'alha-zman 'se-bizbazi (* 'oto).
 I sorry about the-time that-(I) wasted (* it)
 d. 'samtiba-kis 'et kolha-kesef 'se-yakoltila-sim (* 'oto).
 (I) put in-the-pocket ACC all the-money that (I) could put (* it)
 e. hizmanti 'et mi'Ûe-bika'Ûtmi-menile-hazmin (* 'oto).
 (I) invited ACC who that-(you-f) asked from-me to-invite (* him)

(Hebrew; Ur Shlonsky, p.c.)

- (11) a. Estes livros, que você pode achar (eles) em qualquer livraria, ...
 Those books, that you can find (them) in any bookshop, ...
 b. O livro que eu deixei (ele) aqui na mesa desapareceu.
 the book that I left (it) here on the table disappeared
 c. Eu acho mau todo o tempo que eu desperdico (?* ele).
 I regret all the time that I waste (?* it)
 d. Você não imagina o dinheiro que eu ganhei (?* ele) esse ano!
 you not imagine the money that I earned (?* it) this year

- (11) e. Eu avisei quem eu devia avisar (* ele).
 I advised whom I had to advise (* him)

(Brazilian Portuguese)

(c) The third possible language type is one that allows resumptive pronouns in all relative clause types. One instance seems to be Caracas Spanish, as described by Margarita Suñer (1998; p.c.) (but see section 6.1):⁹

⁸ In Hebrew, in case of relativization of the object of a preposition, a free relatives seems to allow a clitic resumptive pronoun attached to the stranded preposition:

(i) kaniti 'et m a she-hexlatet 'alav.

(I) bought ACC what that-(you) decided on-it

However, Borer (1984: 239) argues that this is actually a doubling clitic rather than a true resumptive pronoun.

⁹ Another case could be Irish, which allows resumptive pronoun in all A' structures according to McCloskey (1990). I have been unable to test the Irish data for the moment.

(you) cannot imagine the gossips on John_i that (he_i) heard at the party

In (14a), there is a different amount of time for each of us: this means that the "head" [*time*] is interpreted in the scope of the universal subject of the maximalizing relative clause. In (14b), the anaphor embedded in the "head" can only be bound by the subject of the most deeply embedded clause *Gianni* and not by the higher subject *Maria*: this shows that the "head" is obligatorily reconstructed in the lowest position and it is not visible in the intermediate Comp position for anaphor binding. Finally, in (14c) the null subject of the relative clause cannot corefer with the R-expression *Gianni* embedded in the "head": this Principle C effects confirms that the "head" is obligatorily reconstructed in the lowest position, which is c-commanded by the null subject.

As for restrictive relatives, it is necessary to distinguish two possible interpretations. If the "head" receives a nonspecific interpretation,¹¹ the pattern is as in (14):

- (15) a. L' [immagine di sé_i] che ognuno_i cerca di trasmettere *t* agli altri...
the image of himself_i that everyone_i tries to convey to other people
b. L' [immagine di sé_{i/*j}] che Maria_j dice [*t* che Gianni_i cerca di trasmettere *t* agli altri]...
the image of himself_{i/*j} herself_j that Mary_j says that John_i tries to convey...
c. * L' [immagine di Gianni_i] che *pro*_i cerca di trasmettere *t* agli altri...
the image of John_i that (he_i) tries to convey to other people

A different pattern emerges when the "head" receives a specific interpretation. For reasons that are not entirely clear,¹² this interpretation is forced when the determiner is indefinite: by definition, the "head" cannot be interpreted in the scope of the universal subject of the relative clause, as shown in (16a) below. Interestingly, this property correlates with a different reconstruction pattern: All the chain links are visible for anaphor binding, as shown in (16b); furthermore, the Principle C effect in (16c) is considerably less sharp than in (14c) and (15c), which suggests that the R-expression is not visible in the base position at LF.

- (16) a. *pro* ho avvertito un [paziente] che ogni medico visiterà *t* domani. (*">\$)
(I) advised a patient that every doctor will examine tomorrow
b. *pro* mi hanno riferito alcuni [pettegolezzi su di sé_{i/j}] che Maria_j dice [*t* che Gianni_i ha sentito *t*].
(they) reported to me some gossip on himself_i/herself_j that Mary_j fears that John_i may have heard.
c. ? *pro* ho comperato una [scultura di Defendi_i] che *pro* dicono che *pro*_i abbia realizzato su mia ispirazione.
(I) bought a sculpture by Defendi_i that (they) say that (he_i) realized under my inspiration.

Finally, nonrestrictive relatives show a third pattern:

- (a) no scope reconstruction;
(b) no anaphor binding under reconstruction;
(c) no Principle C effects:

- (17) a. *pro* ho telefonato a i due pazienti cardiopatici, che ogni medico visiterà *t* domani.
(I) phoned to the two cardiopath patients, that every doctor will examine tomorrow
(*">2)

¹¹ One possible objection is that in (15) the "head" may contain a PRO controlled by the subject of the relative clause; this would account for anaphor binding in (15a,b) and for the Principle C effect in (15c) without actual reconstruction of the "head":

- (i) the [PRO_i image of himself_i] that everyone_i / Gianni_i tries to convey...
(ii)* the [PRO_i image of Gianni_i] that *pro*_i tries to convey...

Note however that it is never possible to realize an overt possessive (* *his image of himself*), which suggests that there is no thematic role for the postulated PRO.

¹² See Bianchi (1999: 46) and Zamparelli (1998) for some discussion.

- b. Maria_i mi ha riferito [quei pettegolezzi su di sé_{i/*j}], per i quali, a quanto pare, Gianni_j si è offeso *t*.
 Mary_i reported to me those gossips on herself_{i/*} himself_j, by which apparently John_j was offended
- c. ? [L'ultima scultura di Defendi_i], che *pro*_i ha appena finito di realizzare *t*, non sarà messa in vendita.
 the last sculpture by Defendi_i, which (he_i) has just finished realizing, will not be put on sale.

In a nonrestrictive relative, the "head" is by definition denotationally independent of the relative clause: in fact, the subject cannot take scope over the "head" (17a), nor can it bind an anaphor within it (17b); furthermore, no principle C effect arises in (17c), where the null subject corefers with an R-expression embedded in the "head". In short, nonrestrictive relatives show no reconstruction effects at all.

4.2. LF chains

As mentioned above, Chomsky's (1995) analysis of reconstruction is based on the assumption of the copy theory of traces. Thus, the reconstruction of the "head" of relative clauses constitutes an argument in support of a raising analysis in which the "head" directly raises from the relativization site (Schachter 1973; Kayne 1994: 87; Bianchi 1999: chapter 4). Let us assume for the present purposes the following version of the raising analysis:¹³ the relative clause is a CP selected by an external Determiner, and the relative "head" is a DP which raises from the argument position to Spec,CP (the copy-trace is indicated between angled brackets):

- (18) [_{DP} the [_{CP}[_{DP} D° book]_i [that I bought <[_{DP} D° book]_i> yesterday]]]

In this analysis, the only operator is the external D°; the relative "head" contains an indefinite relative D° (null in (18))¹⁴ which does not bind the open position of its NP complement. The latter is instead bound by the external D°.¹⁵

The A' chain is constituted by identical copies of the "head" raised to Spec,CP. Under this approach, it is possible to reduce the reconstruction patterns in (14)-(17) to Rizzi's (1997) theory of LF chains.

On this theory, a movement chain can be modified by applying a deletion operation to the chain links. The first possibility is to delete all the chain links except for the lowest one.¹⁶ As a result, the trace in the base position is no longer c-commanded by any higher copy and it gets "shrunk", i.e. it becomes fully visible in the LF representation, since it is the head of the resulting (one-membered) chain. This yields a *nonspecific chain*, in which the "head" receives either an amount interpretation (in maximalizing relatives) or a nonspecific one (in restrictive relatives).¹⁷ Since the lowest chain link is fully visible in LF, it shows full reconstruction effects: it is assigned narrow scope; if it contains an anaphor, the latter must be bound by the

¹³ Kayne (1994: chapter 8) and Bianchi (1999).

¹⁴ When the relative D° is overt, the NP complement has raised overtly to its left, yielding the order <D° NP which ...>. See Bianchi (1999: 74-80) for discussion.

¹⁵ See Bianchi (1999: 80-86) for justification of this hypothesis.

¹⁶ More specifically, in an operator-variable chain it is the restrictive term of the operator that gets deleted in all the chain links except for the lowest one. Under the hypothesis that the relative DP does not contain any operator, I assume that the whole DP undergoes reconstruction.

¹⁷ On the nonspecific interpretation of phrases reconstructed in the base position cf. Diesing (1992), Heycock (1995), building on Heim (1982: chapter 2). I adopt the Heim-Diesing hypothesis that the reconstructed phrase is interpreted as a nonspecific indefinite, that is, a (nonrestricted) free variable to be bound by an external operator. In the relative structure, the "head" is coindexed with the external D° and gets bound by it.

closest c-commanding potential binder; if it contains an R-expression, the latter is visible for Principle C:¹⁸

- (19) a. [_{DP} il [_{CP} [~~tempo~~]_i [che ciascuno di noi ha dedicato <tempo_i> a questo progetto]]]
 b. [_{DP} i [_{CP} [pettegolezzi su di sé] che Maria_j dice [_{CP} <pettegolezzi su di sé*_j> che Gianni_i ha sentito <pettegolezzi su di sé_i> alla festa]]]
 c. * [_{DP} i [_{CP} [pettegolezzi su Gianni]_i] che pro_i ha sentito <pettegolezzi su Gianni_i> alla festa]]

If instead no deletion applies, we get a *specific LF chain*: the "head" receives a specific interpretation in Spec,CP; all the lower copies are preserved, but they are not "shrunk". This yields the LF representations in (20):

- (20) a. [_{DP} un [_{CP} [paziente]_i [che ogni medico visiterà <paziente>_i domani]]]
 b. [_{DP} alcuni [_{CP} [pettegolezzi su di sé] che Maria_j teme [_{CP} <pettegolezzi su di sé_j> che Gianni_i abbia sentito <pettegolezzi su di sé_i>]]]
 (20) c. ? Ho comperato [_{DP} una [_{CP} [scultura di Defendi]_i] che dicono che pro_i abbia realizzato <scultura di Defendi_i> su mia ispirazione]]

In (20a) the lowest copy is not shrunk, and it is not visible for scope assignment: consequently, the "head" cannot have narrow scope w.r.t. the universal subject of the relative clause. In (20b), all the chain links are preserved: although they are not shrunk, the anaphor they contain is visible for binding, yielding multiple binding options. On the contrary, in (20c) the lowest occurrence of the R-expression in the nonshrunk trace seems not to be visible for Principle C. Thus, there seems to be an asymmetry between anaphors and R-expressions occurring in nonshrunk traces.

I believe that it is possible to account for this asymmetry by refining the notion of binding index, a refinement that is made necessary by the copy theory of traces. In (20c), the referential index *i* appears both on the highest occurrence of the R-expression and on the copy-occurrence. However, the copy-occurrence is non-shrunk, and it is licensed by being chain-connected to the highest occurrence. Let us represent the highest independent occurrence of the index as a superscript, and the dependent copy-occurrence as a subscript.¹⁹ (20c) then corresponds to the abstract configuration (21):

- (21) ... R-expressionⁱ ... proⁱ ... <R-expression_i>

On the other hand, we can represent the referential index of an anaphor as an intrinsically dependent index, which is licensed by being bound by the independent index of an antecedent. (20b) will then correspond to the abstract structure (24):

¹⁸ According to Rizzi (1997), in a nonspecific chain the D° operator is deleted in the lower chain links: the latter only contain the NP substructure (i.e. the restrictive term). Therefore, the lower chain links cannot bear a referential index, and a binding chain is not licensed. The only possibility is to have an antecedent-government chain, which cannot cross a weak island, e.g. a negative island (cf. Rizzi 1990: ch. 3):

(i) [_{DP} D° NP]_i ...not ... [_{DP} D° NP]

I propose that in nonspecific relative clauses the whole DP "head" undergoes reconstruction, since the relative D° is not an operator. However, the reconstructed "head" has to be bound by the external D° at LF.

(ii) [_{DP} D° [_{CP} ... not ... [_{DP} DREL NP]]]

Note that this configuration is parallel to (i) above: in both cases a D° operator must bind a NP/DP category across a negative island. We can then assume that the island blocks the binding relation between the D° operator and its variable: this yields a vacuous quantifier and an unbound variable, both violating Full Interpretation. This binding relation is thus different from binding in the sense of sharing of referential indices, which can cross a weak island.

¹⁹ See Fiengo & May (1994: 47 ff.) on the distinction between independent and dependent indices.

(22) [... anaphor ...] ... Maria^j ... <... anaphor_j...> ... Gianniⁱ ... <... anaphor_i...>

We can now account for the apparent invisibility of the lower occurrence of the R-expression in (21) on the basis of the following hypothesis:

(23) Only independent indices are subject to Principle C.²⁰

This accounts for the reconstruction pattern in (16)/(20).

Finally, let us consider nonrestrictive relatives. The lack of reconstruction effects in (17) leaves us without any direct support for a raising analysis. One could assume, then, that nonrestrictive relatives differ from restrictives in that they contain a relative operator coindexed with a syntactically independent "head". However, Kayne (1994: 110-115) has proposed a raising analysis that can derive the relevant properties of nonrestrictives. In his approach, after raising of the "head" to Spec,CP the IP subconstituent of the relative clause moves out of the c-command domain of the external D^o in LF:

(24) [_{IP} ogni medico visiterà <_i due pazienti cardiopatici> domani]... [_{DP} _i [_{CP} [due pazienti cardiopatici] [_{C^o} _{t_{IP}}]]]

Let us consider the status of the LF chain after IP movement has taken place. Note that the lower chain link(s) contained in the raised IP are no longer in the scope of the external D^o, hence they cannot be interpreted as variables bound by it. Extending Rizzi's (1997) typology, I propose that in this configuration the internal structure of the lower link(s) gets deleted: what remains is an empty category with no internal structure, which only shares the referential index of the "head":

(25) [_{IP} ogni medico visiterà _{e_i} domani]... [_{DP} _i [_{CP} [due pazienti cardiopatici]_i _{C^o} _{t_{IP}}]]

The empty chain link in (25) is equivalent to a definite anaphoric pronoun.²¹ Accordingly, I will call this third type of LF chain a *pronominal chain*.²²

This proposal straightforwardly accounts for the complete lack of reconstruction of the "head". Since the lower chain link is definite and anaphoric, no scope interaction will be possible. Furthermore, since its internal structure is deleted, it does not contain any occurrence of the anaphor or R-expression embedded in the "head": accordingly, we find no anaphor binding nor Principle C effects under reconstruction.

4.3. A restatement of the empirical generalization

Let us now go back to the empirical generalization (13), repeated here:

²⁰ This proposal may also be extended to account for anti-reconstruction effects in A chains, assuming that the copy-occurrences of an R-expression in an A chain too bear dependent indices:

(i) [Every argument that Johnⁱ is a genius] seems to himⁱ <[every argument that J o h n _i i s a g e n i u s] > t o b e flawless. (Example from Fox 1999: 192).

²¹ The deletion of the lower chain links bears some resemblance to Safir's (1996) "resumption conversion rule", which turns a trace into a resumptive pronoun in LF.

L. Rizzi (p.c.) asks whether the A' chain in nonrestrictive relatives could be taken to involve an empty resumptive pronoun from the beginning. I think not: the reason is that according to Cinque (1990: 106-108), nonrestrictive relatives differ from constructions with true resumptive chains (e.g. COD, island violations, parasitic gaps) in that they are clearly derived by successive cyclic A' movement. Safir (1996) makes the same point.

²² I have here revised in the light of Rizzi's (1997) typology of LF chains the analysis proposed in Bianchi (1999:146-148).

- (13) appositive > restrictive > maximalizing relative
 z type I m g g
 z---- type II ----m g
 z----- type III -----m

Given our analysis of the three relative clause types in terms of different LF chains, the generalization can be rephrased as follows:

- (26) pronominal > specific > nonspecific chain link
 z type I m g g
 z---- type II ----m g
 z----- type III -----m

Note that there is an interesting discrepancy between (13) and (26): the nonspecific chain is found not only in maximalizing relatives, but also in nonspecific restrictive relatives (recall the discussion around (15)). Thus, the restated generalization (26) predicts that nonspecific restrictive relatives pattern with maximalizing ones with respect to crosslinguistic variation. This prediction will be discussed in section 5.3.

In sum, I have reduced the reconstruction patterns of the three relative clause types to different LF chains. This theory of LF chains is crucially based on the copy theory of reconstruction, which in turn presupposes a raising analysis. I guess that the reader will have an obvious objection: how can all this be reconciled with the existence of *resumptive* relative clauses of the three types? The occurrence of a resumptive pronoun seems to be incompatible with a raising analysis: either the relativization site is filled by a resumptive pronoun in the base or it is filled by the "head" to be raised, but it cannot be filled by both. The next section will be devoted to the solution of this apparent paradox.

5. Deriving the empirical generalization

5.1. On referential indices

The next step of my argument will be to characterize the links of the three LF chains in terms of different referential indices. My proposal is based on Enç's (1991) theory of specificity and definiteness, which I will now briefly summarize.

On this theory, each DP²³ bears two indices: the first one denotes the discourse referent of the whole DP, and the second one denotes a discourse referent in which the referent of DP is included:

- (27) Every [_{DP} a]_{<i,j>} is interpreted as (x_i) and
 x_i $\bar{\text{O}}$ x_j if DP_{<i,j>} is plural
 {x_i} $\bar{\text{O}}$ x_j if DP_{<i,j>} is singular.

Each index can be definite or indefinite. If definite, it is subject to the Familiarity Condition (Heim 1982): the referent that it points to must be familiar, that is, it must have been previously introduced in the discourse. If instead the index is indefinite, it is subject to the Novelty Condition: it must introduce a new discourse referent. The core of Enç's proposal is in the following definitions:

- (28) a. A DP is definite iff its first index is definite.
 b. A DP is specific iff its second index is definite.

Briefly put, if a DP is specific its denotation is not familiar but it is included in a familiar discourse referent. An important consequence of this proposal is that definiteness implies specificity: since identity of referents entails inclusion, if the first index is definite the second one is too (Enç 1991: 9).

²³ NP in Enç (1991). I adopt the by now standard hypothesis that reference is a property of DP, and I revise Enç's definitions accordingly.

The links in the three LF chains can now be characterized as bearing different referential indices:

- (29) Nonspecific link Specific link Pronominal link

first	second	first	second	first	second
DEF -	DEF -	DEF -	DEF +	DEF +	DEF +

It is possible to assume that the definiteness features are lexically specified on the relative D° and trigger the derivation of the appropriate LF chain. In fact, in some languages specificity is lexically encoded in two different forms of the relative determiner: e.g. Hungarian *amit* vs. *amelyk* (cf. Szamosi 1976; Horvath 1986: 44 ff.); English *which* seems to be specific, since it cannot occur in maximalizing relatives (Carlson 1977, Grosu & Landman 1996) and it seems to induce a specific interpretation of the "head" in restrictive relatives (Bundrick 1989). However, lexical specification of definiteness on the relative D° is less plausible, especially so in the approach to the nonrestrictive relative proposed in (24)-(25). The core of that proposal is that the properties of nonrestrictive relatives derive from IP raising, with no extra features to distinguish them from restrictives.

Pursuing that approach, I propose that the definiteness features associated to the two indices are not (necessarily) lexically specified on the relative D°, but they are encoded in specific LF configurations. Let us reconsider the three LF chains, schematically represented in (30)-(33):

- (30) [CP DP_i [IP ... <DP_i>]] Æ [CP e [IP ... DP_i]] (nonspecific chain)
 (31) [CP DP_i [IP ... <DP_i>]] (specific chain)
 (32) [CP DP_i [IP ... <DP_i>]] Æ [IP ... e_i] ... [CP DP_i t_{IP}] (pronominal chain)

By inspecting these abstract representations, we find the following correspondences. A [-definite] second index corresponds to the chain's head being visible in an argument position (30); a [+definite] second index instead corresponds to the chain's head being visible in Spec,CP (31-32). Put differently, specificity is licensed in Spec,CP²⁴ - or, following Diesing (1992), it is licensed by an occurrence of the relevant phrase outside the VP domain in LF.

The definiteness of the first index instead correlates with the status of the chain's tail. If the chain's tail has a visible internal structure, it is interpreted as a variable: if shrunk (30), it is a nonrestricted variable (a Heim indefinite); if nonshrunk (31), it is a restricted variable ranging over a familiar set. In either case, the chain does not denote a fixed discourse referent: this corresponds to a [-definite] first index.

In the pronominal chain (32), instead, the link in the argument position has no visible internal structure, since deletion has applied. The empty category is interpreted as a definite pronoun anaphoric to the chain's head, i.e. denoting a familiar discourse referent: this corresponds to a [+definite] first index.

As mentioned above, a [+definite] first index implies a [+definite] second index. In fact, a [+definite] first index implies that the chain's tail has no internal structure; a [-definite] second index implies that the higher chain links are deleted. Thus, these two feature specifications are incompatible because they would jointly imply the complete deletion of the internal structure of the chain links, violating the Recoverability Condition.

In this way, the properties of specificity and definiteness are directly implemented in LF configurations rather than by means of lexically specified features.

At this point, I propose to represent the referential index of a DP as a feature structure which contains Enç's first and second index. Furthermore, I adopt Pollard & Sag's (1994: 24-26) proposal that the referential index contains the phi-features of gender, number and person:

- (33) ^a
 g first i
 g second j

²⁴ Or more accurately, in some Spec of the complementizer system (Rizzi 1997b). I leave open the question whether the occurrence of the phrase in the Comp system must be licensed by satisfaction of an F-criterion (in the sense of Rizzi 1991).

g
g phi a
g g per {1st, 2nd, 3rd}
g g num {sing, plur}
g g gend {m, f, n}
g z
z

Note that this analysis only accounts for the possibility of occurrence of resumptive pronouns in certain structures, but not for their actual occurrence. In fact, in all of the examples in (8) to (14) the resumptive pronouns are optional. I assume that the PF spell-out of referential indices is optional, in the sense that syntax only determines where it may take place; I believe that other extra-syntactic factors determine the actual realization of resumptive pronouns in any given example.²⁹

5.3. *Nonspecific vs. specific restrictive relatives*

As mentioned above, the restatement of generalization (13) as (26) has one consequence yet to be verified: since restrictive relatives with a nonspecific interpretation of the "head" involve a nonspecific chain, they are predicted to pattern with maximalizing relatives w.r.t. the distribution of resumptive pronouns. In particular, we expect a discrimination to emerge in type II languages, which allow resumptive pronouns in pronominal and specific chains but not in nonspecific ones.

This prediction is borne out in Hebrew. Doron (1982: 25) points out that in restrictive relatives, a resumptive pronoun forces a *de re* interpretation of the "head" in examples like the following:

- (35) dani yimca ?et ha-i?sa ?se hu mexapes (*ota*).
dani will find ACC the woman that he seeks (her)

Sells (1987: 287-92) notes that in (36) the resumptive pronoun forces a specific interpretation of the "head", so that the latter cannot be in the scope of the universal QP: this results in a deviant interpretation.

- (36) kol exad yikne ?et ha me?il ha xada?s ?se hu carix (?* ?oto).
every person will-buy the coat new that he needs (it)

Thus, the realization of a resumptive pronoun disambiguates a restrictive relative by indicating a specific LF chain.

Similarly, in Brazilian Portuguese the realization of a resumptive pronoun in a restrictive relative blocks scope assignment under reconstruction of the "head";³⁰ as discussed above, the latter property is restricted to nonspecific chains:

- (37) a. Eu telefonei pros dois pacientes que cada medico vai visitar *t* amanha. (?? ">2)
I phoned to-the two patients that every doctor will examine tomorrow
b. Eu telefonei pros dois pacientes que cada medico vai visitar *eles* amanha. (*">2)
I phoned to-the two patients that every doctor will examine them tomorrow

Furthermore, Cristina Figueiredo and Carlos Miotto (p.c.) have pointed out that a resumptive pronoun is incompatible with a generic interpretation of the "head" (38a), whereas it is compatible with a specific one (38b):

- (38) a. * Um medico que *ele* ganha muito dinheiro não pode ser honesto.
a doctor that he earns a lot of money cannot be honest
b. Eu conheco um medico que *ele* ganha muito dinheiro.
I know a doctor that he earns a lot of money

²⁹ A probably relevant factor is the focus structure of the clause. C. Figueiredo (p.c.) finds a resumptive pronoun more marginal in (i), where the relative clause is in clause-final focussed position, than in (ii), where the relative clause occurs in a clause-initial DP:

- (i) ?? Eu vou vestir o vestido que 'ce me deu ele no Natal.
I will wear the dress that you to-me gave on Christmas day
(ii) O livro que eu deixei ele aqui na mesa desapareceu.
the book that I left it here on-the table disappeared

³⁰ The latter is also very marginal with gap relativization, for reasons that I do not understand. There is however an appreciable contrast.

Here too, resumptive pronouns are incompatible with a nonspecific LF chain in restrictive relatives. Thus, we can conclude that cross-linguistic variation is sensitive to the nature of LF chains, and that the latter give a more adequate characterization of the data than the descriptive labels of "nonrestrictive" vs. "restrictive" relatives.

6. Some open problems

6.1. Caracas Spanish

The generalization in (26) also predicts that in type III languages resumptive pronouns do not force a specific interpretation of the "head", since they can spell out a nonspecific chain link. However, Suárez (1998: 358) points out that in Caracas Spanish a resumptive direct object clitic forces a specific interpretation of the "head", blocking scope reconstruction:

- (39) los tres estudiantes que cada profesor debe entrevistarlos (* ">3)
 the three students that every professor must interview-them

And a subject resumptive pronoun blocks a generic interpretation of the "head", as in Brazilian Portuguese (M. Suárez, p.c.):

- (40) a.* Un doctor que él gana mucho dinero no puede ser honesto.
 a doctor that he earns a lot of money cannot be honest
 b. ? Yo conozco un doctor que él gana mucho dinero.
 I know a doctor that he earns a lot of money

Suárez (1998) argues that the direct object clitic is intrinsically [+specific] (cf. Suárez 1988); Suárez (1999) suggests that this is due to the fact that the resumptive clitic forces the "head" to be interpreted outside the VP, so that it receives a specific interpretation by Diesing's (1992) Mapping Hypothesis. This idea may also be extended to the subject resumptive pronoun in (40), assuming that it blocks reconstruction of the "head" in the VP-internal subject position. Suárez also shows that an indirect object resumptive pronoun is instead compatible with scope reconstruction:

- (41) a. los tres estudiantes que cada profesor les debe dar tarea extra (÷ ">3)
 the three students that every professor to-them must give extra exercise
 b. los tres estudiantes que cada profesor debe hablar con ellos (? ">3)
 the three students that every professor must speak with them

However, the pronoun in (41a) is probably an instance of indirect object clitic doubling (see Suárez 1988: 394-395), rather than a true resumptive pronoun. This leaves us with (41b). Note that here the pronoun is the complement of a preposition, and it does not alternate freely with a gap like the ones in subject and direct object position.

Let us also reconsider the examples of resumptive pronoun occurring in nonspecific chains:

- (11) c. No puedes imaginar las materias que las dan año de por medio nada más!
 [you] not can imagine the subjects that [they] them teach every other year only
 d. Cuando ese profesor hablaba, recibía una atención que no se la prestaba Jorge a ningún otro.
 when that professor spoke, [he] received an attention that not CL it paid Jorge to anyone else

There are two things to be noted about (11d): first, the external determiner is indefinite, and this in general induces a specific interpretation of the "head"; second, the "head" of the degree relative has been extracted from a negative island and takes wide scope w.r.t. the negative phrase. This suggests that despite appearances, (11d) actually involves a specific chain. The same may be true in (11c), if the speaker has a specific set of subjects in mind. These data

suggest that the amount interpretation is actually consistent with a specific chain;³¹ but then (11c,d) are no evidence to the effect that Caracas Spanish is a third type language.

In conclusion, the Caracas Spanish data are somewhat contradictory, and open to different interpretations. I have been unable so far to locate a clear case of a third type language; one may even call into question the existence of such a language type, in which the realization of a resumptive pronoun does not signal any definiteness opposition. I have to leave this question open for further research.

6.2. *Pseudo-restrictive relatives*

There is an apparent exception to generalization (26): in Type I languages, a resumptive pronoun is allowed in some apparently restrictive relative clauses with an indefinite "head":

- (42) a. Te imprestarò un pochi de libri che ti pol lezer(*li*) co ti vol. (Venetian)
(I) to-you will lend some books that you can read (them) when you want to
b. A 'l m'à cüntat sö ü segreto ca 'l gh' (*l'*) ìa mai cüntat sö a nesü.
he to-me has told a secret that he to-him (it) had never told to nobody
(Bergamasco)

In these structures, the realization of the resumptive pronoun is strongly favoured by the presence of an operator: a modal in (42a), negative phrases in (42b). The resumptive pronoun clearly marks the wide scope of the "head".

Prince (1990) has suggested that relative clauses with an indefinite "head" are actually pseudo-restrictive: the indefinite "head" introduces a new discourse referent, "the relative clause serving simply to predicate some property of that entity... the appropriate file card has already been independently constructed/activated" (Prince 1990:492). If the relative clauses in (42) are nonrestrictive, then they do not disconfirm the empirical generalization (26). However, I do not think that all relative clauses with an indefinite "head" can be classified as nonrestrictives: in fact, those in (16) above show a reconstruction pattern distinct from that of nonrestrictives in (19).³² My guess is that the versions of (42) with resumptive pronouns may be covert *such-that* clauses.³³ Alternatively, one may assume that some relative clauses with an indefinite "head" receive a pseudo-restrictive interpretation, depending on contextual factors yet to be determined.³⁴ I leave this question open for future research.

6.3. *Fronting of resumptive pronouns*

Another problem for my analysis is the possibility of "fronting" of resumptive pronouns in certain languages, e.g. in Hebrew:

³¹ Note however that the examples in (8)-(11) involve the expressions "to waste time" and "to earn money", which do not lead themselves to a specific interpretation of the "head".

³² Moreover, subjunctive relative clauses with an indefinite "head" cannot be characterized as nonrestrictive, but they are closer to *such-that* clauses:

(i) Cerco una segretaria che parli bene il russo.
(I) am looking for a secretary that speak-SUBJ fluently Russian

³³ The existence of covert *such-that* clauses is supported by the following English data:

(i) This is the type of car that the carburettor never works properly. (from Grosu & Landman 1996)

(ii) Listen, I could tell you things about Louis which you wouldn't wave to him no more.

(from A. Miller, *A view from the bridge*)

³⁴ Again, a relevant factor seems to be the presence of a modal/quantificational operator. In colloquial Italian, I perceive a contrast between the equivalent of (47b) in (i) and the non-intensional context in (ii):

(i) Mi ha raccontato un segreto che non l'aveva mai raccontato a nessuno.

(ii) ?? Ho riportato un libro che me l'avevi prestato due mesi fa.

(I) have brought-back a book that (you) to-me had lended two months ago

- (43) ha-?i s̃ se-?oto ra?iti
 the-man that-him (I)-saw

I proposed that resumptive pronouns are the spell-out of the referential index on the tail of the LF chain, i.e. in the variable position. My approach commits me to the claim that in (43) the referential index has been spelled out on an intermediate chain link. Note that the pronoun follows the complementizer *se*: therefore, the relevant chain link does not occur in Spec,CP.

Following Shlonsky (1992: note 2), I assume that the resumptive pronoun in (43) is in a Topic position. I adopt Rizzi's (1997b) proposal that this is the Specifier of a Topic head below C°: the "head" in (43) must have raised through this position on its way to Spec,CP.

- (44) [DP D° [CP DP_{REL} [TopP <DP_{REL}> [Top° [IP ...<DP_{REL}>...]]]]]
 z-----mz-----m

Movement to Spec,TopP is only licensed if the "head" agrees with Top° for the feature [topic]. The "head" raises further to Spec,CP in order to check the features of the external D°: then, the Topic Criterion must be satisfied by the trace in Spec,TopP. I assume that this is possible because in specific chains the trace is a full copy of the "head".

Note however that the resumptive pronoun cannot be spelled out on any intermediate chain link. Actually, it is necessary to distinguish two types of chain link. The whole chain is an interpretable LF object; however, not all chain links are "interpretable", in the sense that not all of them are assigned an interpretation by the C-I component. The tail of the chain is theta-related, hence interpretable; the higher links are interpretable iff they are operator positions or they are assigned a certain interpretation under Spec/head agreement, e.g. in Spec,TopP. Other intermediate chain links are instead irrelevant for interpretation, and they are simply there in order to satisfy locality principles. (Contrary to Chomsky & Lasnik 1991, Rizzi 1997 crucially assumes that the intermediate chain links are not completely erased). Suppose that we adopt the following definition of interpretable position:

- (45) An interpretable position is
 (i) an operator position
 (ii) an A' bound A position
 (iii) the Spec of a [+F] head, F an interpretable feature.

We can then assume the following PF constraint:

- (46) Only a chain link in an interpretable position may be spelled out.³⁵

In (44), referential index is spelled out on the chain link in Spec,TopP, which satisfies (45iii).

7. Concluding remarks

To conclude this paper, I wish to briefly discuss the status of "intrusive" pronouns that rescue island violations. These are not limited to relative clauses, but also appear in other (operator-headed) A' chains:

- (47) a. the guy who I hate almost everything *he* does (Kroch 1981)
 b. ¿Qué libro me dijiste que no recuerdas donde (**lo*) pusiste? (Caracas Spanish)
 which book (you) to-me said that (you) not remember where (you) (* it) put

What type of violation do strong islands induce? Note that binding relations - in the sense of sharing of a referential index - are not blocked by strong islands: consider for instance quantifier binding in (48a) and binding of a long-distance anaphor in (48b):

- (48) a. Ogni ragazzo_i dimentica [tutto ciò che i genitori gli_i insegnano].
 every boy forgets all that his parents teach him

³⁵ Once again, the notion of interpretable position is defined in LF; therefore, Spell-Out must apply to LF.

- b. Gianni_i si è dimesso [dopo il fallimento del proprio_i progetto].
Gianni resigned after the failure of his own project

Therefore, we expect chain binding not to be blocked in (47). But the chain connection is more than this: not only do the chain links share a referential index,³⁶ but they are also identified as distinct occurrences of the same syntactic element, which together form a single syntactic object. It is this relation that is blocked by strong islands:³⁷ the head and the tail cannot be recognized as belonging to the same chain. Consequently, the tail cannot be licensed as a copy-trace of the head. Suppose that under these conditions the internal structure of the tail is deleted, being unlicensed. This predicts that intrusive pronouns completely lack reconstruction effects. The prediction seems to be borne out, as shown by the following data:

- (49) a. [Quanti pazienti] *pro* ti chiedi se ogni medico potrà visitarli? (*" > wh)
how many patients do you wonder if every doctor will be able to examine them
b. *[Quale dei propri_i quadri] *pro* vuoi sapere [a chi Gianni_i lo ha regalato] ?
which of his own pictures do (you) want to know to whom Gianni gave it
c. ? [Quale dei quadri di Gianni_i] *pro* vuoi sapere [a chi *pro*_i lo ha regalato] ?
which of Gianni's pictures do (you) want to know to whom (he) gave it

Note that the head and the tail share a referential index, so that the structure is interpretable for the C-I component; however, the tail cannot be interpreted as a variable, but only as a definite anaphoric pronoun. In this way we derive Chao & Sells' (1983) observation that intrusive pronouns can only be interpreted as E-type pronouns.³⁸ Consider now the structure with respect to the PF component. In the latter, an element can be deleted only if it is a member of a chain in which another link is fully spelled out: this is because at least one link of each chain must be fully spelled out (presumably an aspect of the Recoverability Condition). But in (47), the tail of the chain is separated from the head by a strong island, and it is not chain-connected to it. As a result, the tail has to be spelled out. Since it is an empty category bearing only a referential index, the latter is spelled out as an intrusive pronoun.

The analysis of intrusive pronouns that I have derived from my approach is in all respects equivalent to an analysis in which the intrusive pronoun is merged in the argument position and representationally A'-bound by an operator directly merged in the A' position. One advantage of my analysis for a derivational framework is that it does not require the comparison of two derivations with two different initial numerations (one including the intrusive pronoun, the other not). In a representational framework, the question of base generation vs. movement does not even arise; the various LF chains are distinguished on the basis of the amount of structure that their links share. What really matters is that the proposed characterization of the LF chain can correctly derive the observed properties.

In conclusion, I wish to summarize the main points of my argument:

- (i) The three relative clause types can be reduced to three different LF chains.
- (ii) This reduction is based on the copy theory of traces and on the raising analysis of relative clauses.
- (iii) A resumptive pronoun is the lexicalization of a referential index of a given type on the tail of the chain.
- (iv) This presupposes a theory in which PF operations apply to LF, the only interface level of the syntactic component.

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³⁶ Except for nonspecific chain, as discussed in note 18.

³⁷ On the contrary, this relation is not blocked by lack of c-command in the LF structure of the nonrestrictive relative. This assumption is independently required to account for remnant VP topicalization (see den Besten & Webelhuth 1990, who argue that lack of c-command is allowed only for argument traces).

³⁸ In this respect the pronoun in Suñer's example (41b) does not behave as an intrusive pronoun. I leave this problem open.

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