TOWARDS A NON-ELLIPTICAL ANALYSIS OF VERBLESS RELATIVE ADJUNCTS

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Abstract: This paper presents an analysis of a set of Romanian and French adjuncts which are usually referred to as elliptical relative clauses. Despite the resemblance they bear to non-restrictive partitive relative clauses, these adjuncts cannot be analyzed as elliptical relative clauses for both syntactic and semantic reasons. A non-elliptical analysis in a construction-based grammar is then provided, which crucially relies on the two notions of *fragment* and *cluster*.

Keywords: ellipsis, fragment, relative clause, Romanian, French

1. Introduction*

The term *ellipsis* has been applied to various constructions which do not present the usual mapping between syntax and semantics (i.e. there is meaning without form). In this paper, we discuss the case of Verbless Relative Adjuncts (henceforth VRAs) exemplified in (1) for Romanian and in (2) for French, which have been described as involving ellipsis because of their formal resemblance with relative clauses. Following the terminology proposed for various elliptical constructions, we refer to the phrase containing elided material (i.e. the VRA) as the *target* and to the clause which provides the interpretation for the target as the *source*.

(1) a. Şapte persoane, [{între | printre} care (şi) cinci poliţişti], au murit într-o explozie.
Seven people, [among which (also) five policemen] have died in an explosion.
b. Au venit trei persoane, [dintre care una ieri].
Have come three people, [among which one yesterday].
'Three people have come, one of them yesterday.'

(2) a. Sept personnes, [parmi lesquelles cinq policiers], sont mortes dans une explosion.
Seven people, [among which five policemen], have died in an explosion.
b. Trois personnes sont venues, [dont une hier].
Three people have come, [DONT one yesterday].
'Three people have come, one of them yesterday.'

This study is based on corpus data. For French, the corpus study was conducted on the French Treebank of University Paris 7 (Abeillé et al. 2003a)). The corpus contains 138 occurrences of VRAs, 127 of which are *dont* VRAs (2b). Lacking a similar corpus for Romanian, we collected from press texts examples containing the three main prepositions found in Romanian VRAs: *dintre* (81 occurrences), *între* (63 occurrences), *printre* (58 occurrences). In French, we can observe a huge gap in the relative use frequency of *dont* VRAs and VRAs of other types. Romanian data is not indicative of the relative frequency of those items in contemporary use.

Similar constructions are also found in other Romance languages such as Italian (3) and Spanish (4):

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(3) a. Quattro persone sono state arrestate, [{tra | fra | *di} cui Maria].[1]
Four people have been arrested, [among which Mary].
b. Quattro persone sono state arrestate, [{tra | fra | di} cui due ieri].
Four people have been arrested, [among which two yesterday]

(4) a. En esta foto, puedes ver varias casas, [entre las cuales la nuestra].
In this picture, can.2ndSG see various houses, [among the which the our].
'In this picture, you can see various houses, among which ours.'
b. Los doce están presentes, [dos de los cuales representados por sus presidentes].
The twelve are present, [two of the which represented by their president].
'All of the twelve are present, two of which represented by their president.'

The outline of the paper is the following. First, we start out by reviewing the main syntactic and semantic similarities between VRAs and relative clauses. Then, we provide theory-neutral evidence against an elliptical analysis of VRAs in both Romanian and French. Finally, we propose an alternative approach within a construction-based grammar.

2. Similarities between VRAs and relative clauses

VRAs have been described as elliptical relative clauses (Grevisse 1993, Gheorghe 2004 and Gheorghe 2005). In this section, we review the syntactic and semantic properties of VRAs which have been taken to support an elliptical analysis of these constructions.

2.1 Syntactic similarities

VRAs are syntactically reminiscent of relative clauses. Like relative clauses, VRAs must be preceded by a noun phrase antecedent in the source. VRAs are introduced by a fronted constituent which we label the *fronted phrase*. It is followed by another constituent which we label the *body* of the VRA.

The fronted phrase is either a prepositional phrase containing a WH form (like Romanian *care*, French *lesquels* 'which') or the form *dont* in French. The WH form is coreferential with the antecedent of the VRA. This is signalled by morphological agreement in French (2a): if the antecedent bears masculine gender, we have the WH form *lesquels*; if it's feminine, then the WH form will be *lesquelles*. Agreement cannot be observed in Romanian because the nominative-accusative form *care* does not vary in gender or number (1). Prepositions appearing in the fronted phrase include Romanian *dintre, între, printre* and French *parmi*, all of which have roughly the same meaning as English *among*. Both in Romanian and French, other partitive expressions are also found in the fronted phrase of VRAs (see the footnote 3).

The prepositional phrases containing WH forms are reminiscent of the extracted phrase which appears in WH relative clauses in both languages (5). As for the French form *dont,* it is only found in relative clauses apart from its use in VRAs (6). In relative clauses, *dont* has been analyzed as a complementizer (Godard 1988, Abeillé et al. 2003b).

(5) El a scris numeroase romane, [dintre care două au fost publicate luna trecută].
He has written many novels, [among which two have been published month last].

[1] The ungrammaticality of the preposition *di* in (3a) is due to the semantics of the preposition. Italian preposition *di* is incompatible with an exemplifying semantics. For more details, see section 2.2.

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'He has written many novels, two of which have been published last month.'

(6) Il a écrit de nombreux romans, [dont deux ont été publiés le mois dernier].
He has written DE many novels, [DONT two have been published the month last].
'He has written many novels, two of which have been published last month.'

Like extracted phrases or complementizers in relative clauses, the fronted phrase must appear first in VRAs (7a-8a). Even adverbials cannot precede it (7b-8b).

(7) a. *Mai multe țări, [şi Brazilia **printre care**], exportă cafea.
Several countries, [also Brasil among which], export coffee.
'Several countries, among which Brasil, export coffee.'
b. *Mai multe țări, [în mod special **printre care** Brazilia], exportă cafea.
Several countries, [especially among which Brasil], export coffee.
'Several countries, among which especially Brasil, export coffee.'

(8) a. *Plusieurs personnes, [Jean **parmi lesquelles**], sont venues.
Several people, [John among which], have come.
'Several people, among which John, have come.'
b. *Plusieurs personnes, [principalement **parmi lesquelles** Jean], sont venues.
Several people, [mainly among which John], have come.
'Several people, among which mainly John, have come.'

The body of a VRA can be constituted of either a single phrase or a sequence of phrases. If the body contains a single phrase, it can be either a noun phrase in the citation form or a phrase of any category whose form parallels that of the corresponding XP in the source.

While in most VRAs, marking of single phrases is either ungrammatical, e.g. French *parmi* VRAs (10), or strongly dispreferred, e.g. Romanian *dintre* VRAs (11a), French *dont* VRAs (12a), case or prepositional marking is preferred in Romanian {*între* | *printre*} VRAs but is only grammatical with the adverbial *şi* 'also' (9). In the case of Romanian *dintre* and French *dont* VRAs, no example of marked single phrase was found in the press corpus[2]. However, it is not clear whether marking is ungrammatical or simply disprefered. Note that the presence of adverbs such as Romanian *mai ales* 'especially' (11b) or French *notamment* 'notably' (12b) is sufficient to improve the acceptability of these examples.

(9) a. Ion a oferit flori mai mult**or** fete, [printre care şi {Maria | Mari**ei**}].
John has offered flowers several.DAT girls, [among which also {Mary.NOM | Mary.DAT}].
'John has offered flowers to several girls, Mary among them.'
b. Ion a vorbit **cu** mai multe fete, [printre care şi (**cu**) Maria].
John has talked with several girls, [among which also (with) Mary].
'John talked to several girls, among which Mary.'

(10) J'ai parlé **à** plusieurs personnes, [parmi lesquelles (***à**) Marie].
I have talked to several people, [among which (to) Mary].
'I talked to several people, among which Mary.'

(11) a. Ion lucrează **cu** şapte medici, [dintre care (***cu**) doi ruşi].

[2] The French Treebank is constituted of articles from the daily newspaper *Le Monde*, which is representative for French standard written press.

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John works with seven doctors, [among which (with) two Russian].

b. Ion lucrează **cu** şapte medici, [dintre care mai ales **cu** doi ruşi].
John works with seven doctors, [among which especially with two Russian].
'John works with seven doctors, among which two Russian citizens.'

(12) a. J'ai parlé **avec** certaines personnes, [dont (***avec**) Marie].
I have talked with some people, [DONT (with) Mary].
'I talked to some people, among which Mary.'

b. %Un jeune homme annonce **à** divers protagonistes sa mort prochaine, [dont notamment **à** un psychiatre qui se sent dans l'obligation de l'aider].
A young man announces to various protagonists his imminent death, [DONT notably to a psychiatrist who feels like he must help him out].

When the body of a VRA is constituted of a sequence of phrases which are not related by functions, the form of the phrases parallels those of the corresponding phrases in the source.

(13) Am primit cadouri de la mai multe persoane, [printre care şi o rochie de la Maria].
I received presents from several people, [among which also a skirt from Mary].

(14) Il a envoyé trois lettres à ses amis, [parmi lesquelles deux à Marie].
He has sent three letters to his friends, [among which two (of them) to Mary].

Like extraposed relative clauses, VRAs are not always adjacent to their noun phrase antecedent. Constraints of the VRAs linearization are the following. If the antecedent of the VRA is a direct dependent of the clause's head, the VRA can appear anywhere within the clause (15a-16a) after its antecedent (15b-16b). If the antecedent of the VRA is not a direct dependent of the clause's head, then the VRA must follow it directly (15c-16c). Note that VRAs obey the right roof constraint which is known to apply on extraposition (15d-16d).

(15) a. I-am rugat pe câțiva prieteni, ([printre care şi (pe) Ion]), să mă ajute la bagaje ([printre care şi (pe) Ion]).
'I asked some friends, among which John, to help me with the luggage.'

b. *Am primit, [printre care şi o rochie de la Maria], cadouri de la mai mulți.
I received, [among which also a skirt from Mary], presents from several people.

c. Reprezentanții mai multor țări, ([printre care şi Brazilia]), s-au reunit ieri ([*printre care şi Brazilia]).
'Representatives from several countries, among which Brasil, have met yesterday.'

d. *Că lipsesc mai multe persoane nu mă şochează, [printre care şi Maria].
That many people are absent doesn't shock me, [among which also Mary].

(16) a. J'ai demandé à quelques amis hier, ([dont un que tu connais]), de m'aider à déménager ([dont un que tu connais]).
'I asked some friends yesterday, one of which you know, to help me move.'

b. *Paul a vendu, [dont un à Marie], des gâteaux à plusieurs personnes.
Paul has sold, [DONT one to Mary], cakes to several people.

c. Des représentants de plusieurs pays, ([dont le Brésil]), se sont réunis, ([*dont le Brésil]).
'Representatives from several countries, among which Brasil, have met yesterday.'

d. *Que deux personnes viennent ne devrait pas t'étonner, [dont Marie].
That two people come should not surprise you, [DONT Mary].

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2.2 Semantic similarities

Semantically, VRAs resemble non-restrictive relative clauses. Restrictive relative clauses have an intersective interpretation and therefore introduce an implicit 'contrast set', which can be accessed by anaphors like *the others* (Arnold 2004a, Arnold 2004b, Arnold and Borsley 2008). Non-restrictive relative clauses, on the other hand, are not intersective modifiers and introduce no such 'contrast set'. For example, the restrictive clause in (17a) is interpreted as restricting the set of friends to a particular subset (those I told you about). The VRA in (17b) does not restrict the set of Mary's friends to the one including John. Therefore, there is no possible antecedent for *the others*.

(17) a. Prietenii Mariei despre care ți-am vorbit au venit. Ceilalți prieteni ai Mariei vor veni mâine.
Mary's friends about which I told you have come. The other friends of Mary will come tomorrow.
b. Prietenii Mariei, [printre care şi Ion], au venit. #Ceilalți prieteni ai Mariei vor veni mâine.
Mary's friends, [among which also John], have come. The other friends of Mary will come tomorrow.

Both Romanian and French VRAs have a partitive semantics. More specifically, they introduce a subpart relation between the denotation of their antecedent and the denotation of some phrase contained in the body (either the single phrase or one of the phrases in a sequence of phrases). As a result, VRAs can only have antecedents which denote plural entities whose subparts are accessible (i.e. sum-denoting entities).

Romanian and French VRAs can have two distinct semantics. Exemplifying VRAs must be distinguished from partitioning VRAs. Exemplifying VRAs name independently identifiable subparts of the plural entity denoted by their antecedent, i.e. set-element relations (18a-19a). Partitioning VRAs, on the other hand, partition the plural entity denoted by their antecedent into smaller entities based on additional properties which are not shared by the entities which compose the original plural entity, i.e. set-subset relations (18b-19b). A noticeable difference between the exemplifying and partitioning VRAs is that only the latter can be exhaustive.

(18) a. In total, au venit {*două | trei} persoane, [printre care şi Maria şi Ion].
In total, have come {two | three} people, [among which also Mary and John].
b. In total, au venit trei persoane, [dintre care una ieri şi două azi-dimineață].
In total, have come three people, [among which one yesterday and two this morning].
(19) a. Au total, {*deux | trois} personnes sont venues, [dont Marie et Jean]
In total, {two | three} people have come, [DONT Mary and John].
b. Au total, trois personnes sont venues, [dont une hier et deux ce matin].
In total, three people have come, [DONT one yesterday and two this morning].

Both in Romanian and French, VRAs constructions can be either compatible with both an exemplifying or partitioning semantics or with only one of the two. A summary of Romanian and French VRAs is given in the table 1[3].

[3] Other WH VRAs are expressions like Rom. *în {rândul / mijlocul / fruntea} cărora* 'in the midst of' / 'at the top of' or Fr. *au {premier / second / dernier} rang de* 'in the {first / second / last} position of', *au sommet de* 'at the top of', *au sein de* 'in the midst of'.

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Romanian	**semantics**	**compatible with marked single phrases**
{între | printre} care + other WH	both	yes (with the adverbial *şi* 'also')
dintre care	partitioning	no
French	**semantics**	**compatible with marked single phrases**
dont	both	yes (but preference for unmarked)
parmi lesquel(le)s + other WH	exemplifying	no

Table 1. Inventory of VRA items in Romanian and French.

(20) a. Paul a citit mai multe cărţi, [{între | printre | *dintre} care şi Biblia].
Paul has read several books, [among which also the Bible].
b. Paul a scris mai multe romane, [{între | printre | dintre} care două în limba franceză].
Paul has written several novels, [among which two in French].

(21) a. Paul a parcouru cinq livres sur le sujet, [{dont | parmi lesquels} le gros sur l'étagère].
Paul has glanced through five books on this topic, [among which the big one on the shelf].
b. Paul a parcouru cinq livres sur le sujet, [{dont | *parmi lesquels} la moitié hier].
Paul has glanced through five books on this topic, [the half of them yesterday].

VRAs contribute a new event which is a subevent of the one denoted by the source. In (22a), 'Mary has come to see me' is a subevent of 'Several friends of mine have come to see me'. It is not sufficient to say that the VRA expresses a relation between 'Mary' and 'several friends of mine'. It must be stated in the semantics that (22a) means 'Mary has come to see me'. In partitioning VRAs, a subpart of the antecedent plural entity may be identified only on the basis of properties of the new event (22b).

(22) a. Mai mulţi prieteni, [printre care şi Maria], au venit să mă vadă.
'Several of my friends, Mary among them, have come to see me.'
b. Mai mulţi prieteni au venit să mă vadă, [dintre care unul chiar ieri].
'Several of my friends have come to see me, one of them only just yesterday.'

3. VRAs are not elliptical relative clauses

There are two approaches to elliptical constructions: the structural one and the non-structural one. Within structural approaches, it is assumed that the 'missing structure' is either present at some point and is then deleted or simply that it is left unpronounced. In such an approach, a VRA can be represented in a simplified way as in (23a), where angled brackets enclose deleted or unpronounced material. The non-structural approach assumes no missing structure (23b). Both the meaning and the form of the construction must be accounted for without positing an underlying structure.

(23) a. Ellipsis-based Analysis b. Fragment-based Analysis

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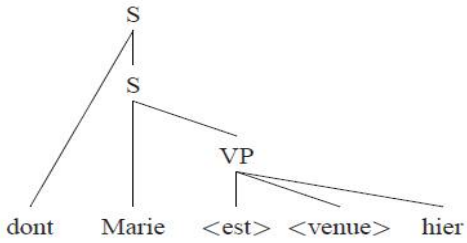


There is both syntactic and semantic evidence against an ellipsis based account of VRAs.

3.1 Syntactic arguments against ellipsis

If we adopt an ellipsis-based approach (23a), there are at least three strategies for verbal reconstruction in VRAs. We can reconstruct: (I) a verbal form of the same lexeme as the verb of the source (24a-25a); (II) a form of an existential verb (e.g. Rom. *a se afla, a fi,* Fr. *être* 'to be') (24b-25b); (III) a form of a quotation verb (e.g. Rom. *a cita, a menționa,* Fr. *citer, mentionner* 'to mention') (24c-25c).

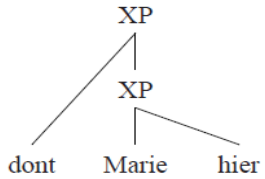
(24) a. Ion a pictat mai multe tablouri, [dintre care două (**sunt pictate**) la mare].
John has painted many paintings, [among which two (were painted) at the seaside].
b. Israelul a omorât peste 700 de palestinieni, [dintre care 220 (**sunt**) copii].
Israël has killed over 700 Palestinian people, [among which 220 (were) children].
c. Preda a scris mai multe romane, [dintre care **citățm** *Moromeții*].
Preda has written many novels, [among which we mention *Moromeții*].

(25) a. Jean a peint beaucoup de tableaux, [dont deux (**ont été peints**) à la mer].
John has painted many paintings, [among which two (were painted) at the seaside].
b. Paul a écrit cinq livres, [dont deux (**sont**) sur le même sujet].
Paul has written five books, [among which two (are) on the same topic].
c. Zola a écrit beaucoup de romans, [dont (on peut **citer**) *Germinal*].
Zola has written many novels, [among which (one can mention) *Germinal*].

These strategies are not applicable in all contexts. Rather the right one must be chosen for each example. The criterion for the choice amounts to finding a verb form with the right subcategorization properties to accommodate for the specific form of the VRA. For example, a verbal expression like French *faire partie de X* 'to belong to' can be used to reconstruct a verbal form in *dont* VRAs but not in *parmi* VRAs, because *faire partie* does not subcategorize for a *parmi*-marked complement.

(26) Plusieurs de mes amis, [{dont | *parmi lesquels} Anne (fait partie)], sont venus me voir.
Several of my friends, [among which Ann (belongs to)], have come to see me.

The reconstruction of a verbal form is sometimes ruled out on syntactic grounds because of too many constraints on the verb subcategorization. This is often the case when the VRA contains a cluster of phrases, where none of the three mentioned strategies will work.



(27) a. Plusieurs personnes ont reçu un cadeau, [dont Marie un livre].
Several people have received a present, [DONT Mary a book].

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b. *Plusieurs personnes ont reçu un cadeau, [dont Marie a reçu un livre].
Several people have received a present, [DONT Mary has received a book].
c. *Plusieurs personnes ont reçu un cadeau, [dont Marie est un livre].
Several people have received a present, [DONT Mary is a book].
d. *Plusieurs personnes ont reçu un cadeau, [dont on cite Marie un livre].
Several people have received a present, [DONT one mentions Mary a book].

A more complex reconstruction involving internal relative clauses may be proposed in those cases, but those would not account for constraints on sequences of phrases in VRAs which must always be constituents of the same level in the source (28).

(28) ??/*Mes amis croient que la vie existe sur d'autres planètes, [dont Marie sur Mars].
My friends believe there is life on other planets, [DONT Mary on Mars].

Moreover, if we apply to a syntactic reconstruction in VRAs, we cannot explain why in Romanian preposition or case marking is ruled out in partitioning VRAs with *dintre care* (11a), while it is possible in VRAs with {*între* | *printre*} *care* (9).

Additional evidence against elliptical structures is based on the properties of French *dont* and of nounless noun phrases which are frequently found in VRAs. Nounless noun phrases which function as direct complement of a verb trigger the realization of the pronominal affix *en* on the verb. As the complementizer *dont* itself is incompatible with the realization of *en* on the verb, this leads to the impossibility to reconstruct a verbal form in (29a).

(29) a. Il a offert trois livres, [dont deux à son frère].
He has offered three books, [DONT two to his brother].
'He offered three books, two of them to his brother.'
b. Il *(en) a offert deux à son frère.
He AFF has offered two to his brother.
c. *dont il a offert deux à son frère
DONT he has offered two to his brother
d. *dont il en a offert deux à son frère
DONT he AFF has offered two to his brother

Therefore, there is no general reconstruction mechanism that will work for VRAs. Lexical constraints must be taken into account in each case (30). Since it's ad hoc and dispensable, syntactic reconstruction must be abandonned.

(30) Media precipitațiilor anuale este de 1000 mm, [dintre care (??) între 50 şi 60% (??) vara].
'Average rainfall per year is 1000 mm, among which between 50 and 60% in the summer.'

3.2 Semantic differences

The analysis of VRAs as elliptical relative clauses predicts that the semantic contribution of VRAs should be the same as that of non-restrictive partitive relative clauses (5-6). We show that this prediction is not borne out.

3.2.1 VRAs are part of the asserted content of the utterance

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Both in Romanian and French, the semantic contribution of non-restrictive relative clauses does not belong to the asserted content of the utterance. They have been analyzed as a kind of conventional implicature. One of the empirical correlates of this property is that propositional attitude verbs usually tend not to scope over the contribution of a non-restrictive relative clause. This property is not shared by VRAs which must scope under attitude verbs. Thus, (31) does not mean that the speaker commits to the fact that vervain can heal ulcers, but only to the fact that John believes so.

(31) Ion crede că anumite plante, [printre care şi sunătoarea], pot vindeca ulcerul.
'John believes that some plants, among them vervain, can heal ulcers.'

Non-restrictive relative clauses can locally comment on their antecedent, while VRAs cannot. This is why (33) is a felicitous continuation of (32) only in the version which contains the non-restrictive relative clause (i.e. *dont Balzac est le plus célèbre*).

(32) Les grands auteurs du XIXe, [{dont Balzac | dont Balzac est le plus célèbre}], sont beaucoup lus par les enfants.
'Great authors from the 19th century, {among which Balzac | among which Balzac is the best known}, are still much read by the children.'
(33) Il est donc étrange que Balzac en particulier soit autant boudé des enfants.
'Therefore it is strange that Balzac in particular is so much ignored by children.'

Assimilating VRAs to restrictive relative clauses instead is not a solution because VRAs do not restrict the denotation of their antecedent either.

3.2.2 Strict partitive semantics

The set of relations expressed by VRAs is much more constrained than the set of relations which can be expressed using partitive relative clauses. Meronymic relations, for example, can be expressed using partitive relative clauses, but not using VRAs.

(34) *Lui Paul îi plac fetele, [între care (mai ales) părul lor blond].
'Paul adores the girls, among which (above all) their blond hair.'

One of the phrases belonging to the body of the VRA must contribute a semantic entity which is a subpart of the semantic entity contributed by the antecedent of the VRA. This explains why, although pied-piping is in principle possible in VRAs, no deviation from the direct subpart relation is allowed (35).

(35) a. Les candidats, [parmi les dossiers desquels *(figure) celui de Jean].
'The candidates, among the applications of which (there is) the one of John.'
b. Les candidats, [parmi les plus importants desquels (figure) Jean].
'The candidates, among the most important of which (there is) John.'

3.2.3 Selection properties of the fronted phrase

The semantics of the VRA is constrained by the semantics of the fronted phrase. Romanian preposition *dintre* is only compatible with a partitioning semantics (36a), while French preposition *parmi* is only compatible with an exemplifying semantics (36b).

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(36) a. Au venit mai multe persoane, [{*dintre | printre} care Maria].
'Several people have come, among which Mary.'
b. Plusieurs personnes sont venues, [{*parmi lesquelles | dont} la majorité hier].
'Several people have come, most of them yesterday.'

This is unexpected under an elliptical analysis of VRAs, because the predicate expressing the relation between the VRA and its antecedent is supposed to be the missing verbal head of the relative clause. Indeed, it is possible to paraphrase an exemplifying semantics with a relative clause whose filler is headed by the preposition *dintre* (37), while VRAs whose fronted phrase is headed by the preposition *dintre* are incompatible with an exemplifying semantics.

(37) Au venit mai multe persoane, [dintre care {o amintim pe Maria | *Maria}].
'Several people have come, among which {we mention Mary | Mary}.'

4. A non-elliptical analysis of VRAs

The elliptical analysis fails to account for the syntactic and semantic properties of VRAs. In this section, an alternative analysis is introduced, accounting for (I) the fragment semantics of VRAs, (II) the syntactic properties of the body which can be a cluster, and (III) the syntactic properties of the construction as a whole.

4.1 Fragment semantics

Fragments are expressions whose semantic contribution is only partially given by their form. Their semantic contribution is a function of (I) the type of the fragment, (II) contextual information, and (III) the literal content of the fragment. For instance, the semantic contribution of the fragment *when* in (38a) is a function of its type (i.e. short question), contextual information (i.e. the source clause *Mary will come*) and the literal content *when* which combines with the semantic type conveying a question about the time. As a whole, the fragment *when* has a similar content with *when Mary will come*, as shown in (38b).

(38) a. Mary will come but nobody knows [when].
b. Mary will come but nobody knows [when Mary will come].

Sentential fragments resemble description anaphora, where the anaphoric expression introduces a new semantic entity which shares some of its description with the antecedent, but the entity itself is not shared.

(39) a. [Paul has lost his keys again]$_i$. It$_i$ happened yesterday.
b. [Paul has lost his keys again]$_i$. It$_j$ has never happened to me.

We propose a semantics for fragment within Minimal Recursion Semantics (MRS, cf. Copestake et al. 2005)). In a flat semantics such as MRS, meaning is represented as 'bags' of elementary predications. It is possible to represent partial meaning, such as the literal meaning of a fragment, as underspecification. The problem of semantic reconstruction for fragments can be expressed as constraints between four bags of elementary predications. This is illustrated with the example in (40). The first bag of relation (noted A in (41)) represents the semantic contribution of the source, the second (B) the literal content of the fragment, the

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third (C) the shared description, and the fourth (D) the semantic content of the target which is given in (40b).

(40) a. Plusieurs personnes sont venues, [dont Marie hier].
Several people have come, [among which Mary yesterday].
b. Marie est venue hier.
Mary has come yesterday.

The two relations that are used are set unification between the bags B and C yielding D, and set intersection between A and D yielding C. Set unification yields several results which are further constrained by syntactic constraints on fragments (such as marking). Using intersection is motivated by the fact that fragments have a 'greedy' interpretation. The meaning of the target in (40a) cannot be something less precise, such as 'Mary has done something yesterday'.

(41)

$$\begin{bmatrix}
\text{SOURCE} & \boxed{A} \begin{bmatrix} \text{HOOK} \begin{bmatrix} \text{IND } \boxed{1} \end{bmatrix} \\ \text{RELS} \left\langle \begin{bmatrix} \textit{message-rel} \\ \text{IND } \boxed{1} \end{bmatrix}, \begin{bmatrix} \textit{come-rel} \\ \text{IND } \boxed{1} \\ \text{ARG1 } \boxed{2} \end{bmatrix}, \begin{bmatrix} \textit{several-rel} \\ \text{IND } \boxed{2} \end{bmatrix}, \begin{bmatrix} \textit{person-rel} \\ \text{IND } \boxed{2} \end{bmatrix} \right\rangle \end{bmatrix} \\
\text{LITERAL MEANING} & \boxed{B} \begin{bmatrix} \text{HOOK} \begin{bmatrix} \text{IND } \boxed{3} \end{bmatrix} \\ \text{RELS} \left\langle \begin{bmatrix} \textit{message-rel} \\ \text{IND } \boxed{3} \end{bmatrix}, \begin{bmatrix} \textit{name-rel} \\ \text{IND } \boxed{4} \end{bmatrix}, \begin{bmatrix} \textit{yesterday-rel} \\ \text{IND } \boxed{3} \end{bmatrix} \right\rangle \end{bmatrix} \\
\text{SHARED DESCRIPTION} & \boxed{C} \begin{bmatrix} \text{HOOK} \begin{bmatrix} \text{IND } \boxed{5} \end{bmatrix} \\ \text{RELS} \left\langle \begin{bmatrix} \textit{message-rel} \\ \text{IND } \boxed{5} \end{bmatrix}, \begin{bmatrix} \textit{come-rel} \\ \text{IND } \boxed{5} \\ \text{ARG1 } \textit{ind} \end{bmatrix} \right\rangle \end{bmatrix} \\
\text{TARGET} & \boxed{D} \begin{bmatrix} \text{HOOK} \begin{bmatrix} \text{IND } \boxed{3} \end{bmatrix} \\ \text{RELS} \left\langle \begin{bmatrix} \textit{message-rel} \\ \text{IND } \boxed{3} \end{bmatrix}, \begin{bmatrix} \textit{come-rel} \\ \text{IND } \boxed{3} \\ \text{ARG1 } \boxed{4} \end{bmatrix}, \begin{bmatrix} \textit{name-rel} \\ \text{IND } \boxed{4} \end{bmatrix}, \begin{bmatrix} \textit{yesterday-rel} \\ \text{IND } \boxed{3} \end{bmatrix} \right\rangle \end{bmatrix}
\end{bmatrix}$$

4.2 Clusters

It has been noted that elliptical constructions do not always have the same distribution as their source. The conjunction *ainsi que* 'as well as' can be followed by a sequence of phrases with an alleged clausal source, but cannot be followed by a clause (42) (cf. Abeillé and Godard 1996). Mouret (2006) notes that the same is true for Argument Cluster Coordination, as shown by the use of double conjunctions in (43).

(42) Paul a offert un livre à Marie, ainsi qu'(*il a offert) un CD à Anne.
Paul has given a book to Mary, as well as (he has given) a CD to Ann.

(43) a. Paul a offert soit un livre à Marie soit un CD à Anne.
Paul has given either a book to Mary or a CD to Ann.
b. *Paul a offert soit un livre à Marie soit il a offert un CD à Anne.

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Paul has given either a book to Mary or he has given a CD to Ann.

Following Mouret (2006), we analyze such sequences of phrases which are not related by functional relations as clusters. This analysis does not link the distributional properties of the cluster to the distribution of its source.

Three cluster types are found in VRAs. Clusters of the first type mimick a clause containing a verb form of the same lexeme as that of the source (24a-25a). The phrases in the cluster must be marked as the corresponding phrases in the source. Clusters of the second type are composed of a noun phrase expressing a subpart of the antecedent and one predicative phrase which restricts the noun phrase expressing the subpart (24b-25b). Clusters of the third type display an interesting category mismatch (44-45). They are found when the antecedent of the VRA is a noun phrase containing a past participle expressing a functional property of the entity within an event. Those clusters are built as if the past participle contributed the event relation of the cluster rather than a property of a participant. This is shown by the fact that adverbs (such as Rom. *grav* or Fr. *grièvement* 'critically') are used to modify the relation, rather than adjectives.

(44) Bilanțul accidentului se ridică la 8 răniți, [dintre care doi foarte grav].
The toll of the accident raises to 8 injured people, [among which two critically].

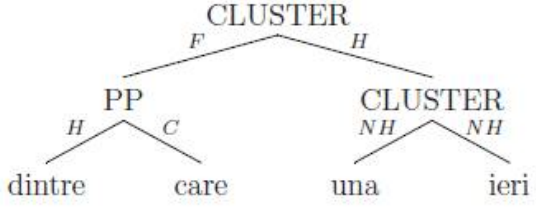
(45) L'attentat de samedi a fait 9 morts et 45 blessés, [dont 4 grièvement].
The attack on Saturday has made 9 casualties and 45 injured, [DONT 4 critically].

The phrases which are found in such clusters can assume two distinct semantic functions. Either they denote a subpart of the antecedent of the VRA or they merely function as restrictors on the introduced subpart or event.

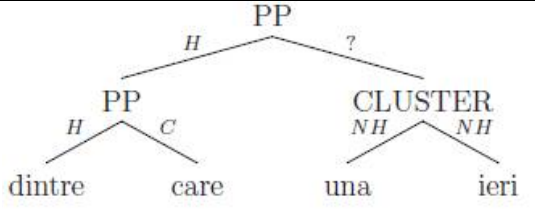
4.3 Functional relations

There are three analytical options for the analysis of function relations within VRAs. Either the body is the head (analysis A in (46)[4]) or the fronted phrase is the head (analysis B) or there is no head (analysis C). Analysis A should be preferred over analysis B and C because the body has head properties. Within analysis A, we analyze the fronted phrase as a functor (van Eynde 2006).

(46)



Analysis A: The body is the head.



Analysis B: The fronted phrase is the head.

[4] Capitals on the leaves of the tree structures in (46) stand for syntactic functions: F = functor, H = head, NH = non-head and C = complement.

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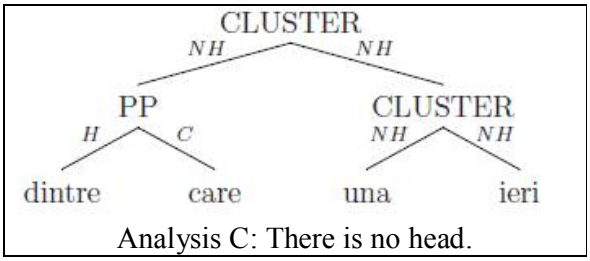

Analysis C: There is no head.

4.3.1 Head properties of the body

The body of the VRA has head properties. Phrases functioning as bodies in VRAs may function as adjuncts alone with similar meaning and distribution. They must either contain adverbials signaling an exemplifying semantics (47a) or be coordinated structures signaling a partitioning semantics (47b).

(47) a. De nombreuses espèces animales, (dont) notamment les oursins, souffrent de la pollution.
'Many animal species, (among which) especially the urchins, suffer from pollution.'
b. Plusieurs personnes, Marie hier et Jean ce matin, ont signalé le problème.
'Several people have reported the problem, Mary yesterday and John this morning.'

Thus, the presence of a fronted phrase is not always necessary for phrases with fragment semantics to function as adjuncts with an exemplifying or a partitioning semantics. Note that in the absence of a fronted phrase, the semantics is not restricted to an exemplifying or a partitioning semantics.

(48) Plusieurs livres, tous sur le même thème, ont été commandés.
'Several books have been ordered, all of them on the same topic.'

Other argument against the analysis of the fronted phrase as the head of the VRA comes from the syntactic realization of the arguments of the head of the fronted phrase. Apart from the form *dont* in French, whose category is unclear, the fronted phrase is always a prepositional phrase. A preposition, such as Romanian *printre* 'among', introduces a semantic relation between two arguments, one of which is typically realized as the complement of the preposition, while the other is not realized within the prepositional phrase itself (49).

(49) Avem [un spion] [printre noi].
have.1stPL [a spy] [among us]
'There is a spy among us.'

Like prepositional phrases such as *printre noi* 'among us', VRAs select a noun phrase. However, the external argument of *printre* in VRAs is not identified with the antecedent of the VRA, but with (one of) the noun phrases in the body.

4.3.2 The fronted phrase as a functor

The function *functor* has been proposed by van Eynde (2006) in order to reduce the number of functions usually assumed within Head-driven Phrase Structure Grammar and, as a result, be

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able to express generalizations on prehead elements in a simplified way. The function *functor* replaces the functions *specifier*, *marker* and (prehead) *adjunct*. Functors are not subcategorized for, but rather select a head. They are able to mark the head they combine with. As a result, a head combined with a functor can have a different distribution than the head alone would have.

We analyze the fronted phrase in a VRA as a functor. The strict linearization of the fronted phrase with respect to the body (7-8), which is not found with other adjuncts such as *par exemple* 'for instance', is an argument in favor of this analysis.

Most importantly, the analysis is motivated by the selection properties shown by fronted phrase and their important contribution to the semantic type of the construction as a whole (cf. table 1).

4.3.3 Locality of selection

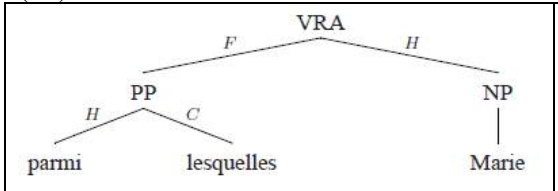
The selection properties of VRAs and the selection properties of their fronted phrase are submitted to the same kind of locality constraints. When a VRA modifies a clause, the noun phrase antecedent of the VRA must be a direct dependent of the clause's head. When a fronted phrase modifies a cluster, the phrase introducing a subpart of the plural entity denoted by the antecedent must be a direct daughter of the cluster.

Such locality constraints on selection can be analyzed using a mechanism allowing adjuncts to modify expressions containing their antecedent, provided it is not embedded too deeply in it. Such a mechanism has been proposed by Kiss (2005) to analyze extraposed relative clauses in German.

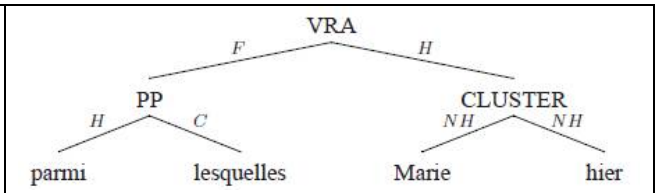
4.3.4 Interaction of constraints

This section summarizes the syntactic and semantic constraints which apply on VRAs and the way they interact with each other.

(50)



a. VRA with NP head



b. VRA with CLUSTER head

Syntactic constraints on VRAs come from (I) properties of clusters, (II) selection properties of fronted phrases, and (III) constructional properties of VRAs. Clusters have inherent properties which can clash with the properties of VRAs. For instance, phrases in clusters must be direct dependent of the source's head and be marked as the corresponding phrases in the source. This will clash with selection properties of some fronted phrases which constraint the phrase expressing the subpart of the antecedent to be an unmarked noun phrase, such as French *parmi lesquels* (51).

(51) a. J'ai parlé de science à mes amis, [{*parmi lesquels | dont} à Marie de physique].
I have talked about science to my friends, [among which to Mary about physics].
b. J'ai parlé de science à mes amis [{*parmi lesquels | *dont} Marie de physique].
I have talked about science to my friends, [among which Mary about physics].

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Constructional properties of the VRA contruction itself include the presence of a fronted phrase with a partitive semantics. For WH VRAs, it must be stated that the fronted phrase must contain a WH form coreferential with the noun phrase antecedent of the VRA.

Semantic constraints on VRAs come from (I) the fragment semantics of VRAs, and (II) the partitive semantics of VRAs. VRAs have a content similar in type to that of a clause. Like other instances of description anaphora, they introduce a new semantic entity which shares some of its description with its antecedent. In the case of VRAs, this is a new event. VRAs introduce two partitive relations. The first partitive relation connects the noun phrase antecedent of the VRA and a new entity introduced by a phrase in the body of the VRA. That relation is expressed by the fronted phrase. This is shown by the fact that VRAs can have either an exemplifying or a partitioning semantics and that not every fronted phrase is compatible with each of these two semantics. The second partitive relation connects the event denoted by the source and the new event introduced by the VRA.[5]

5. Conclusion

Romanian and French VRAs have been described as elliptical relative clauses because of their resemblance with non-restrictive partitive relative clauses. Although an elliptical analysis of VRAs can account for some of their properties, there is also a large body of evidence in both languages which argues against such an analysis.

An analysis of VRAs as adjuncts with fragment semantics is able to account for the whole set of properties exhibited by VRAs. Although the account can appear technically complex, the individual parts which compose it are independently motivated for other constructions in the grammar of both languages.

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[5] For more details about the HPSG analysis and the interaction of constraints, see Bîlbîie and Laurens (2009).

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