A phrase structure approach to argument cluster coordination

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Abstract
It has often been argued that Non-Constituent Coordinations involve ellipsis. Focussing in this paper on so-called 'Argument Cluster Coordination', we provide empirical evidence drawn from French against such elliptical analyses and sketch an alternative approach within HPSG.

1. Introduction*

It has often been argued that Non-Constituent Coordinations such as Argument Cluster Coordination (1a), Right Node-Raising (1b) and Gapping (1c) involve ellipsis. Focussing in this paper on Argument Cluster Coordination (henceforth ACC), we provide theory-neutral arguments drawn from French against such elliptical analyses and propose an alternative approach within HPSG.

(1) a John gave a book to Mary and a record to Jane.
b John hates, but Mary loves, opera.
c John bought a book and Mary a record.

We begin by reviewing the main distributional properties of ACC (§2) and the possible syntactic analyses (§3). Building on previous work (Abeillé & Godard 1996, 2000), we then provide (§4) empirical evidence against elliptical approaches that rely on deletion (see a. o. van Oirsouw 1987, Wilder 1997, Crysmann 2003, Beavers & Sag 2004) or some substitution principle at the syntax-semantics interface (see Sag *et al*. 1985). We conclude that an adequate analysis should allow non-standard constituents to be conjoined in a non-elliptical structure (with the shared predicate outside the coordinate structure), as originally proposed by Dowty (1988) and Steedman (1989, 2000) within Categorial Grammar. Focussing on syntactic issues, we then show (§5) how this structure and its unusual properties can be represented within HPSG without relaxing phrase structure.

2. Basic data

The basic distribution of ACC has been well studied both in English (Dowty 1988) and French (Abeillé & Godard 2002). Let us briefly review the main generalizations.

(i) ACC may involve subcategorized complements (2a), scopal and non-scopal modifiers (2b,c), or some mix of the two (2d,e).

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(2) a Paul offrira un disque à Marie et un livre à Jean.
Paul will.offer a record to Mary and a book to Jean
b Paul viendra probablement lundi et certainement jeudi.
Paul will.come probably on Monday and certainly on Thursday.
c Paul a vu cette exposition à Rome en juillet et à Paris en septembre.
Paul has seen this exhibition in Rome in July and in Paris in September
d Paul a vu Jean à Rome et Marie à Paris.
Paul has seen Jean in Rome and Marie in Paris
e Paul invitera probablement Marie et certainement Jean.
Paul will.invite probably Marie and certainly Jean

Following among others van Noord & Bouma (1994), Abeillé & Godard (1997), Bouma *et al*. (2000), we take modifiers to the right of the predicate to be combined as complements in a flat VP structure. Hence, clusters in (2d,e) involve sister constituents.

(ii) ACC obeys 'Wasow's Generalization' (cf. Pullum & Zwicky 1986) in the same conditions as constituent coordinations, i. e. each conjunct must independently meet the constraints imposed by the shared material. As a consequence, extraction only applies 'across-the-board' (3a,b) and one may conjoin clusters of 'unlikes' in case the shared predicate allows alternative categories as complements (3c). Interestingly, the coordination of clusters of different lengths is also allowed (3d,e) provided the shared predicate may take one complement or more, as shown by the lack of implication from (3d) and (3e) to (4a) and (4b) respectively. Hence, ACC does not obey stronger parallelism constraints than ordinary coordinations, as is often claimed.

(3) a Voici la femme dont le juge a rencontré le mari _ hier et le fils _ ce matin.
Here.is the woman of.whom the judge has met the husband _ yersterday and the son _ this morning
b *Voici la femme$_i$ dont le juge a rencontré le mari _ hier et son$_i$ fils ce matin.
Here.is the woman$_i$ of.whom the judge has met the husband _ yersterday and her$_i$ son this morning.
c Les enseignants attendent des élèves qu'ils respectent le règlement et de leur proviseur un soutien sans faille. (PP-CP + PP-NP)
The teachers expect from.the students that they respect the rules and from their headmaster a strong support
d Paul joue du piano le lundi avec Marie et le vendredi. (PP-NP+NP)
Paul plays the piano on Monday with Marie and on Friday
e Paul a écrit une lettre à sa mère et un petit poème. (NP +NP-PP, from Abeillé & Godard 2002)
Paul has written a letter to his mother and a short poem

(4) a Paul plays the piano on Friday with Marie / with someone
b Paul wrote a short poem to his mother / to someone.

(iii) Long-distance ACC with clusters consisting of non-sister constituents is disallowed, be those constituents 'major constituents' in the sense of Hankamer (1971), that is dependents of the matrix verb or some embedded one (5a), or not (5b).[1] ACC differs from gapping constructions in this respect, where remnants must be major (6a) but not necessarily sister constituents (6b).

(5) a Jean dit de rester chez elle à Marie et ??(de rester) ici à Paul
(from Abeillé & Godard 2002)
Paul says to stay at home to Marie and (to stay) here to Paul
b Paul a donné les jouets de sa fille à Marie et *(les jouets) de son fils à Jean.
Paul has given the toys of his daughter to Mary and ??(the toys) of his son to Jean

(6) a Paul admire le courage de Marie, et Jean ??(le courage) de Pierre.
Paul admires the courage of Marie and Jean (the courage) of Pierre
b Paul a promis d'essayer d'apprendre le latin et Marie le grec.
Paul has promised to try to learn Latin and Mary Greek

(iv) ACC is compatible with all the conjunctions available in French (7), including coordinators such as *ainsi que* which we return to in §4.1.

(7) a Personne n'offrira de disques à Marie {ni / ou} de livres à Jean
No one NE will.offer any records to Marie nor / or any books to Jean
b Je serai absent demain mais au bureau toute la semaine prochaine.
I will be absent tomorrow but at my office next week
c Paul offrira un disque à Marie ainsi qu'un livre à Jean.

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[1]At first sight, English seems more liberal in this respect (compare (i) and (ii), cf. Sag 1976, Dowty 1988). We hypothesize that long-distance ACC is excluded in both languages but that English verbs, unlike French verbs, may combine with a bare preposition and inherit its complement, hence allowing the coordination in (i) to be analyzed as an ordinary local ACC when the preposition is shared. Other examples of apparent long-distance ACC remain problematic (iii). While further research is needed, we suggest such examples might be best analyzed as unambiguous clausal gapping constructions rather than ACCs.
(i) John talked about Manet on Wednesday and (about) Renoir on Thursday. (from Dowty 1988)
(ii) Jean a parlé de Manet mercredi et *(de) Renoir jeudi.
(iii) ?We found a book that was about Civil War hero on Monday and a WWI hero on Thuesday (from Beavers & Sag 2004).

(v) ACC may occur within NP, AP or PP with the same restriction, i. e. long-distance ACC is excluded (8). This is a second difference with gapping constructions, which only occur in the sentential domain.

(8) a Paul désapprouve les propositions du ministre de l'économie en faveur de l'emploi et *(du ministre) de l'éducation en faveur de la recherche.
Paul dislikes the propositions of the minister of economy in favor of employment and (of the minister) of education in favor of research
b Les résultats sont inférieurs à la moyenne régionale de 15% et *(à la moyenne) nationale de 20%.
The results are inferior to the average regional by 15% and (to the average) national by 20%
c Avec la femme de Pierre comme directrice et *(la femme) de Jean comme secrétaire, l'entreprise court à la faillite.
With the wife of Pierre as manager and (the wife) of Jean as secretary, the company is going to collapse

3. Competing analyses

Turning to the syntactic analysis of ACC, three main competing structures have been proposed to account for a coordination such as (2a): an elliptical structure A (figure 1), an elliptical structure B (figure 2) or a non-elliptical structure C (figure 3).[2] Let us briefly make explicit the analytical content of each.

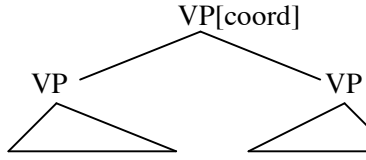

Figure 1- structure A

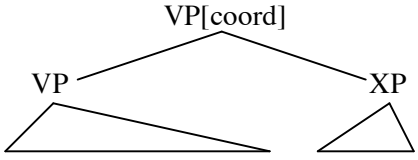

Figure 2- structure B

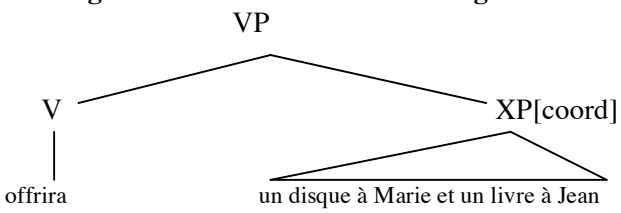

Figure 3- structure C

[2] A fourth possibility would be to assume a 'flatter' VP structure without any coordinate node. Supposing this solution can be formalized, it has the undesirable effect of setting ACC completely apart from constituent coordination, contrary to fact (see §2(ii)). We thus leave it aside in the discussion that follows.

Structure A illustrates a deletion approach to ellipsis. Accordingly, an ACC such as (2a) consists of two VPs the second of which is syntactically complete (so that no specific interpretation rule is needed) but phonologically reduced in that some left peripheral material has been deleted (i. e. ignored by phonology) under appropriate identity conditions with some left material in the first conjunct (see a. o. van Oirsouw 1987 and Wilder 1997 in a transformational perspective, and Crysmann 2003 and Beavers & Sag 2004 within HPSG). While this kind of analysis leaves room for some syntactic and semantic mismatches between antecedent and elided material (depending on exactly what identity conditions one puts on deletion), it crucially requires some grammatical form to be recoverable in the ellipsis site (cf. Chomsky 1964). Such an analysis thus leads one to expect that not only the second conjunct on its own but also the coordination as a whole behave as ordinary VPs.

Structure B makes the second prediction but not the first: while the coordination as a whole in (2a) is analyzed as a VP, its second conjunct constitutes a headless fragment whose syntactic and semantic well-formedness may be defined by a general substitution procedure (see Sag *et al*. 1985). Basically, the fragment is licensed if the substitution of its remnants with some parallel categories in the first VP conjunct gives rise to a syntactically and semantically well-formed structure.

Finally, structure C illustrates an approach to ACC that eschews ellipsis by allowing non-standard constituents to be conjoined in the scope of a shared predicate (see Dowty 1988 and Steedman 1989, 2000 within Categorial Grammar and Hudson 1988, Maxwell & Manning 1996 and Mela & Fouqueré 1996 within Word Grammar, LFG and HPSG respectively).[3] As we show now, only this last structure adequately captures the syntactic properties of ACC in French.

4. Syntactic arguments against ellipsis

We begin by reviewing and extending earlier arguments by Abeillé & Godard (1996, 2000) against both elliptical structures A and B. We then provide new data relying on the distribution of restrictive and additive adverbs and agreement phenomena in favor of non-elliptical structure C. We finally discuss Beavers & Sag (2004)'s positive argument in favor of ellipsis. As we show, the argument, which crucially relies on the putative non-existence of asyndetic coordination in English, is not supported by the data in French.

[3] Alternatively, it has been proposed that structure C involves across-the-board extraction of the verb out of each VP conjunct (see Mordechai & Schacher 1983, Larson 1988). Such an analysis does not account for cases such as (2c) where the shared material corresponds to some non-constituent string, nor does it easily account for the reconstruction problems discussed below. We refer to Dowty (1988: 184-187) for a detailled criticism.

4.1 Abeillé & Godard (1996, 2000)'s arguments

As pointed out by Abeillé & Godard (1996), syntactic reconstruction of the alleged deleted material in ACC is not always grammatical. As they observe, a conjunction such as *ainsi que* may combine with an argument cluster (9a) while it is excluded with finite VP or S elsewhere (9b,c).[4]

(9) a Paul offrira un disque à Marie ainsi qu'un livre à Jean.
Paul will.offer a record to Mary as well as a book to Jean
b *Paul écoute la radio ainsi que lit le journal.
Paul listens to the radio as well as reads the paper.
c *Paul lit le journal ainsi que Marie écoute la radio.
Paul reads the paper as well as Marie listens to the radio

A similar pattern arises with constituent negations in French and English (cf. Culicover & Jackendoff 2006). While adverbs such *(non) pas* / *not* may introduce an argument cluster (10a-11a), they are excluded with finite VP or S (10b,c-11b,c).

(10) a Paul offrira un disque à Marie et (non) pas un livre à Jean.
b *Paul lit le journal et (non) pas écoute la radio.
c *Il neige et (non) pas il pleut.

(11) a Paul gave a record to Mary and not a book to Bill.
b *Paul read the paper and not listened to the radio.
c *It's raining and not it's snowing.

If ACCs are to be represented by elliptical structure A, this means one has to enforce deletion of the finite verb in the second conjunct in (9a-10a-11a). While such a stipulation is no doubt amenable to formalization in existing treatments such as Beavers & Sag (2004)'s, it requires abandoning the recoverability condition on deletion, a rather unattractive move.

On the other hand, structure B correctly predicts those data (since the second conjunct does not contain any verb nor project a VP) but makes it difficult to explain the position of initial conjunctions in so-called 'correlative coordinations'. As Abeillé & Godard (2000) observe, those conjunctions obligatorily occur in French after the shared predicate, be it a verb (12a), or not (12b),

[4] French *ainsi que* differs in this respect from English *as well as* which is excluded as a coordinator in combination with finite S (i), but not with finite VP (see (ii-iii) from Huddleston, Payne & Peterson (2002: 1316):
(i) *[John read the paper] as well as [Mary listened to the radio].
(ii) She [means what she says] as well as [says what she means].
(iii) She [plays the piano] as well as [sings lieder].

rather than before (13), as expected if this predicate were included in the first conjunct. [5]

(12) a Paul compte offrir et un disque à Marie et un livre à Jean.
Paul is.planning.to offer and a record to M and a book to Jean
'Paul is planning to offer not only a record to Marie but also a book to Jean.'

b Les résultats sont inférieurs et à la moyenne régionale de 15% et à la moyenne nationale de 20 %
The results are inferior and to the regional average by 15% and to the national average by 20%
'The results are inferior not only to the regional average by 15% but also to the national average by 20%.'

(13) a *Paul compte et offrir un disque à Marie et un livre à Jean

b *Les résultats sont et inférieurs à la moyenne régionale de 15% et à la moyenne nationale de 20 %

As suggested by Beavers & Sag (2004), one could maintain an elliptical structure by considering that 'initial' conjunctions do not mark the left edge of the first conjunct in coordinate structures but rather the boundary between elided and non-elided material, hence occurring after the shared material. While at first sight attractive, this solution makes it difficult to account for the fact that finite V/VP/S correlative coordinations are rejected by many French speakers with initial conjunctions *et* and *ni* (14-15-16) while none of them rejects corresponding ACC in the scope of a finite verb (17) (cf. Mouret 2005).

(14) a %Paul [et lit et parle] l'anglais couramment.
Paul and reads and speaks English fluently

b %Paul [ni ne lit ni ne parle] l'anglais couramment.
Paul neither NE reads nor NE speaks English fluently

(15) a %Paul [et lit le journal et écoute la radio].
Paul and reads the paper and listens to the radio

b %Paul [ni ne lit le journal ni n'écoute la radio].
Paul neither NE reads the paper nor NE listens to the radio

[5] English data in (i) are similarly used by Hudson (1988) to dismiss a VP analysis of ACC. The argument is however less convincing since English correlatives may float (ii).
(i) John gave {both / either / neither} a book to Mary {and / or / nor} a record to Bill.
(ii) John {both / either/ neither} gave a book to Mary {and / or / nor} a record to Bill.

(16) a %Ce matin, et Paul a lu le journal et Marie a écouté la radio.
This morning, and Paul has read the paper and Marie has listened to the radio
b %Ce matin, ni Paul n'a lu le journal, ni Marie n'a écouté la radio
This morning, neither Paul NE has read the paper nor Marie NE has listened to the radio

(17) a Paul offrira et un disque à Marie et un livre à Jean
b Paul n'offrira ni un disque à Marie ni un livre à Jean

Assuming an elliptical structure would force us to condition the combination of initial *et* and *ni* with some finite VP in the first conjunct to the elision of the head verb in the second conjunct since it is the only case where such combination is allowed. Again, such a stipulation is at odd with the simple generalization that a non-elliptical structure makes available: if neither the first conjunct nor the second includes a predicate, then ACCs as a whole in (17) are non-finite and thus accepted by those speakers who reject (14-15-16).

4.2 Further arguments

We provide two additional arguments against elliptical structures based on the distribution of adverbs and agreement data with argument clusters containing postverbal subjects.

Let us first consider additive and restrictive adverbs. As shown in (18), such adverbs may introduce an ACC and take it as a whole as their semantic associate. How such a reading arises with elliptical structure A or B is unclear. One does not see how the adverb can take the ACC as a whole as its associate if it occurs inside the first VP conjunct. Indeed, no such association out of the first conjunct is allowed elsewhere (19).

(18) a Paul offrira seulement un disque à Marie et un livre à Jean alors qu'il aurait pu aussi offrir des fleurs à Léa.
Paul will offer only a record to Marie and a book to Jean while he could have also offered some flowers to Léa
b Paul offrira aussi un disque à Marie et un livre à Jean alors qu'il aurait pu offrir seulement une bouteille de vin à leurs parents.
Paul will offer also a record to Marie and a book to Jean while he could have offered only some bottle of wine to their parents.

(19) a Paul compte lire seulement le journal et écouter la radio.
Paul is.planning.to read only the paper and listen to the radio
≠'The only thing Paul is planning to do is to both read the paper and listen to the radio.'
b Paul compte lire aussi le journal et écouter la radio.
Paul is.planning.to read also the paper and listen to the radio
≠'Paul is planning to read the paper and listen to the radio and there is some other thing besides those two activities that Paul is planning to do.'

Alternatively, one could try to adjoin such adverbs to the VP or S coordination as a whole and let them be linearized inside the first conjunct by some 'domain union' operation. Leaving aside the fact that such an operation should be restricted to ACC given the absence of association out of the first conjunct in (19), this cannot be the right solution since both restrictive and additive adverbs fail to adjoin to finite VP or S elsewhere in French (20).

(20) a *Paul [seulement [lit le journal]] alors qu'il pourrait aussi écouter la radio.
Paul only reads the paper while he could also listen to the radio
b *Paul [aussi [lit le journal] alors qu'il pourrait se contenter d'écouter la radio.
Paul also reads the paper while he could only listen to the radio

On the other hand, those association phenomena do not raise more problems than usual if one assumes structure C. The restrictive/additive adverb may be adjoined to the coordination as a whole or, alternatively, combined at the same level with the verb and the coordination. In both cases, it has access locally to the coordinate structure.

A last argument against both elliptical structures A and B involves agreement phenomena. As shown by Marandin (1999), postverbal subjects in French 'unaccusative' constructions combine as sisters with complements though still agreeing in number with the head verb. As a consequence, one may conjoin argument clusters containing postverbal subjects. Interestingly, two agreement patterns arise. Either the verb agrees independently with each subject and the interpretation is that of a conjunction of two independent events, as enforced in (21a) by the adverbial *quelques secondes plus tard*, or the verb is plural and the interpretation is that of a complex event, as enforced in (21b) by the adverbial *simultanément*.

(21) [Paul is driving]

a Alors {surgit / *surgissent} d'un buisson une biche, et quelques secondes plus tard d'un champ un renard.
Then {comes / come} from a bush a doe and few seconds later from a field a fox

b Alors {surgissent / *surgit} simultanément d'un buisson une biche et du champ un renard.
Then {come / comes} simultaneously from a bush a doe and from a field a fox

While the first pattern is expected with structures A and B, the second one proves problematic: one does not see how a singular postverbal subject could combine with a plural verb. Alternatively, one could argue that (21b) is an ungrammatical sentence accommodated on pragmatic grounds, along the lines of Beavers & Sag (2004)'s account of some plural agreement phenomena in RNR contexts. This would be plausible if (21b) were of intermediate acceptability compared to (21a). Since it is not the case, this solution seems dubious.[6] On the other hand, nothing in principle precludes the second agreement strategy to occur if one assumes structure C. In such case, the plural predicate does not directly combine with the first singular subject, but rather with the coordination as whole, hence leaving room for some specific agreement constraints (see §5.3).

4.3 A note on asyndetic coordination

We finally show that Beavers & Sag's (2004: 51-53) positive argument in favor of ellipsis in ACC is amenable to discussion. As they argue, asyndetic structures in English are ungrammatical when they contain only two elements and might be best analyzed as resulting from some replanning process when they contain more than two elements. As a consequence, no appropriate structure is available for (22a) if one precludes a VP analysis with ellipsis, for it would imply embedding a binary asyndetic ACC that is excluded elsewhere. The same data obtain in French (22b) but we remain skeptical about the argument. Judgements in the area of asyndetic constructions seem in fact variable in both languages. Moreover, as far as French is concerned, such judgements do not agree with data found in corpora. Indeed, we do find natural binary and non-binary asyndetic structures (23), including cases such as (23b) where a coordination analysis seems inescapable given the general ban in French on non-coordinated bare N' in argument positions (23c).

[6] The argument can be strengthened: in the absence of some adverbial that enforces one of the readings, it is the plural agreement strategy that seems to be preferred.

(22) a Jan travels to Rome tomorrow, to Paris on Friday ??(and will fly to Tokyo on Sunday).
b Paul ira à Rome demain, à Paris vendredi ??(et se rendra à Tokyo dimanche).

(23) a On a eu peur des bombes: on a [des femmes, des enfants] avec nous. (France Inter, 19/07/06)
We were afraid by bombs: we have women, children with us.
b [Effets de glace, sols en verre] créaient des univers mouvants, lumineux, impalpables. (Le Monde, 11/04/06)
Mirror effects, glass floors created moving, luminous, impalpable universes
c *[Effets de glace] créaient des univers mouvant, lumineux, impalpables.

As a matter of fact, some asyndetic structures must be analyzed as a variety of coordination. It remains to be seen why their acceptability is often reduced when they are uttered out of the blue. Data in (22) do not therefore provide strong evidence in favor of an elliptical analysis of ACC.

4.4 Intermediate conclusion

As we have shown, neither a deletion-based approach nor a substitutional one is appropriate to account for the syntactic properties of ACC. We conclude that ACC does not involve ellipsis at all and that an adequate analysis should instead allow non-standard constituents to be conjoined and compositionally interpreted in the scope of some shared predicate, possibly followed by some shared complements (see (2c)).

5. An alternative approach in HPSG

Most existing accounts of ACC that eschew ellipsis achieve such a result by abandoning or partially relaxing fixed phrase structures, allowing syntactic constructs such as higher-order predicates (Dowty 1988, Steedman 1989, 2000), word strings (Hudson 1988), partial expansions of c-structure rules (Maxwell & Manning 1996) or tuples of categories (Mela & Fouqueré 1996) to be conjoined in the scope of some shared predicate. Leaving aside Categorial Grammar whose flexible phrase structures can be justified on independent grounds (see Steedman 2000), the main motivation for such moves is to account for the very fact that neither argument clusters nor ACCs as a whole behave as ordinary constituents regarding phenomena such as cliticization or extraction (24).

(24) a *C'est [un disque à Marie] que Paul offrira.
This is a record to Marie that Paul has offered
b *C'est [un disque à Marie et un livre à Jean] que Paul offrira.

Focussing on syntactic issues, we explore an alternative approach within HPSG, deriving 'non-constituency' neither from argument clusters nor from ACCs, but rather from the lexical requirements of the predicate with which such clusters combine. We sketch in §5.1 the syntax of coordination we assume for French. We then show in §5.2 how argument clusters can be represented as non-headed constituents (rather than 'non'-constituents) and how features get computed when such constructs are coordinated. We finally show in §5.3 how 'non-constituency' can be derived from the lexicon by allowing predicates to be partially saturated by some canonical (hence non-extractible / cliticizable) ACC rather than by an ordinary sequence of constituents.

5.1 A constructional syntax for coordination

Let us first briefly sketch the syntax of coordination we assume for French. As for conjunctions, we follow Abeillé (2003,2005) by analyzing them as 'weak' heads (rather than markers) making a subconstituent with the following phrase and inheriting from it most of their syntactic features. Assuming a lexical type such as (25) for conjunctions (with the CONJ feature from Sag *et al*. 1985) one thus allows head-complements structures such as those illustrated in figures 4 and 5.[7]

(25) *conj-wd* =>

$$\begin{bmatrix} \text{HEAD } \boxed{1} \\ \text{CONJ } \textit{conj} \\ \text{MARKING } \boxed{2} \\ \text{SUBJ } \boxed{3} \\ \text{SPR } \boxed{4} \\ \text{COMPS} < \begin{bmatrix} \text{HEAD } \boxed{1} \\ \text{MARKING } \boxed{2} \\ \text{SUBJ } \boxed{3} \\ \text{SPR } \boxed{4} \\ \text{COMPS } \boxed{L} \end{bmatrix} > + \boxed{L} \end{bmatrix}$$

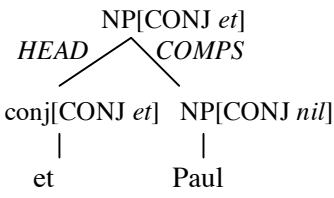

Figure 4

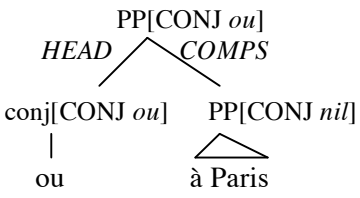

Figure 5

[7] Following Abeillé (2003,2005), we take *sign* to be specified [CONJ *nil*] by default and the argument structure of words to contain only [CONJ *nil*] synsems, hence excluding conjuncts of the form [conj XP] in argument positions.

Turning to the analysis of coordinate structures as a whole, we follow Pollard & Sag (1994) among others by treating coordination as a *sui-generis* non-headed construction, rather than a binary conjunction phrase or some multi-headed construction. Given that coordinate structures in French may be simplex ([X^+ [conj X]$^+$]), correlative ([[conj X] [conj X]$^+$]) or asyndetic ([X X^+]) we posit three subtypes of *coord-cx* (26a), differing on whether some conjuncts (26b), all the conjuncts (26c) or none of them (26c) is headed by a conjunction.[8] As in Sag *et al*. (1985), we make crucial use of the CONJ feature to enforce the identity of conjunctions in case more than one conjunction is realized, hence excluding correlative coordinations such as **Ni Paul ou Marie* (lit. *neither Paul or Mary*).[9]

(26) a *coord-cx* =>
[N-HD-DTRS *list*([CONJ *nil*])+*list*([CONJ [1]¬*nil*])]
a *simplex-coord-cx* =>
[N-HD-DTRS *1-to-n-list*([CONJ *nil*])+*1-to-n-list*([CONJ [1]*et/ou/ni/ainsi-que*])]
b *correl-coord-cx* =>
[N-HD-DTRS *2-to-n-list*([CONJ [1]*et/ou/ni/soit*])]
c *asyndetic-coord-cx* =>
[N-HD-DTRS *2-to-n-list*([CONJ *nil*])]

Feature resolution in coordinate structures has been subject to much debates. Leaving aside agreement phenomena, the problem is basically to determine how Wasow's generalization is to be captured. First, one must account for the fact that coordinations of unlike categories, differing in features such as part of speech or verbal mood can occur if (27a), and only if (27b), some shared predicate allows each category as alternative argument (cf. Sag *et al*. 1985). While analyses allowing left-peripheral ellipsis provide a straightforward account of those data, some specific operation on features is required if such elliptical processes are to be rejected, as we have argued they should be.

(27) a Il n'est pas certain [que Paul s'en aille] ni [que Marie {reviendra / revienne}].
It is not certain (+ _CP[subj]/CP[ind]) that Paul leave.SUBJ nor that Marie {come.back.IND/come.back.SUBJ}
b Il est certain [que Paul s'en ira]et [que Marie {reviendra/*revienne}].
It is certain (+_CP[ind]/*CP[subj]) that Paul leave.IND and that Marie {come.back.IND/come.back.SUBJ}

[8] Here we use a type hierarchy for lists that slightly differs from the one that is usually assumed since Pollard & Sag (1994). See §5.2 for a justification.
[9] Note that we do not posit an empty conjunction in asyndetic coordinations, hence leaving the task to the construction to provide the appropriate semantics, whatever such semantics is.

Second, one must account for the fact that coordination of predicates with different subcategorization requirements can occur if (and again only if) there exists some neutralized argument that can satisfy each of those requirements simultaneously, as shown by French data in (28), adapted from Kayne (1975).

(28) %Paul {nous/*lui/*l'} a écrit et appelé(s) maintes fois.
Paul {us.ACC&DAT/ him.DAT/him.ACC} has written(+_OBJ[*dat*]) and called (+_OBJ[*acc*]) several times.

We follow Sag (2003)'s recent account which appeals to underspecification. We illustrate how coordination data such as (27) may be dealt with while leaving aside the proper treatment of argument neutralization which would take us too far. Let us consider the description in (29). It requires the coordination head features to be either equal to the head features of its daughters, or else less specified, as represented by the ≤ relation (meaning 'equal to' or 'a supertype of') that holds for any embedded feature structure within [0].

(29) *coord-cx* =>

$$\left[\begin{array}{ll} \text{MOTHER} & \left[\begin{array}{l} \text{HEAD } \boxed{0} \mid \boxed{0} \leq \boxed{1},\ldots, \boxed{n} \\ \text{VALENCE } \boxed{A} \\ \text{SLASH } \boxed{B} \\ \text{COORD+} \end{array}\right] \\ \text{DTRS} & \left\langle \left[\begin{array}{l} \text{HEAD } \boxed{1} \\ \text{VALENCE } \boxed{A} \\ \text{SLASH } \boxed{B} \end{array}\right], \ldots, \left[\begin{array}{l} \text{HEAD } \boxed{n} \\ \text{VALENCE } \boxed{A} \\ \text{SLASH } \boxed{B} \end{array}\right] \right\rangle \end{array}\right]$$

As a consequence, coordinations of identical categories may be either fully specified for their head features or else underspecified, while coordinations of unlikes necessarily remain underspecified for the relevant conflicting properties of their conjuncts, such as VFORM in (27a). Assuming on the other hand that selectors impose a lower bound on the type of their arguments, i.e. requires them to be at least as specified as stated (hence possibly underspecified) or else more specified, the data in (27) follow, as we briefly show. Let us assume *finite* to be the immediate supertype of *indicative* and *subjunctive* in the hierarchy of possible values for the VFORM attribute. Let us moreover assume that the instance of the adjectival predicate in (27a) is specified as in (30a) while the instance of the adjectival predicate in (27b) is specified as in (30b). Only an indicative CP or a coordination of such CPs will be allowed as complement in the latter case, hence accounting for the contrast in (26b). On the other hand, three resolutions of the VFORM feature will be allowed in the former case (thanks to the ≤ relation), licensing as al-

ternative complements an indicative CP (or a coordination of such categories), a subjunctive CP (or a coordination of such categories), or else some underspecified finite CP arising from the coordination of an indicative and a subjunctive CP, as in (27a).

(30) a *certain* in (26a): [COMPS <CP[VFORM [1], *finite* ≤ [1]]>]
b *certain* in (26b); [COMPS <CP[VFORM *indicative*]>]

Now, returning to the *coord-cx* in (29), we constrain VALENCE features of the daughters to be equated on the mother in order to prevent predicates with different subcategorization requirements from combining outside neutralization contexts such as (28). We also constrain SLASH features to unify in order to exclude asymmetric extraction patterns, since those are rejected in French even when some asymmetric discourse relation holds between conjuncts (compare French (31a) with English (31b)). Finally note that the *coord-cx* is specified for a boolean feature [COORD+], an ancillary feature which we return to in §5.3.

(31) a *Voici le livre que Paul est allé à la librairie et a acheté _.
b Here is the book that Paul went to the bookshop and bought _.

5.2 Licensing argument clusters

Argument clusters may occur not only in ACC (as symmetric conjuncts), but also in (clausal) gapping constructions (32a,b) as well as in short answers in dialogue (32c) with the same basic property, i. e. the cluster is non-finite (32d). This suggests that argument clusters should be defined independently of coordination.

(32) a Paul a mangé une pomme et [Marie une orange].
Paul has eaten an apple and Marie an orange
b Paul apprécie son café le midi autant que sa tisane le soir.
Paul enjoys his coffee at noon as much as his herbal tea the evening
c [I wonder what kind of goods Paul can sell and to whom in his seedy bookshop]
- Des livres d'occasion à quelques collectionneurs aventureux, je suppose.
Some old books to adventurous collectors, I guess.
d Paul a mangé une pomme {?et non pas / ainsi que} Marie une orange
Paul has eaten an apple {and not / as well as} Marie an orange

Postponing the issue of 'non-constituency' to §5.3, we propose analyzing such clusters as instances of some underspecified non-headed construction *ac-cx* with one daughter or more (33). The construction is valence saturated and specified for a new head feature CLUSTER that takes as its value the list of

synsem description of the construction daughters.[10] Since other head features remain underspecified, the combination of argument clusters with items such as *ainsi que* or *non pas* that select for a non-finite category will hence be allowed. Finally note that the construction amalgamates the SLASH value of its daughters: this is needed to enforce ATB-extraction out of ACCs (see (3a,b)).

(33) *ac-cx* =>

$$\left[\begin{array}{l}\text{MOTHER}\ \left[\begin{array}{l}\text{HEAD}\ \left[\begin{array}{l}head\\ \text{CLUSTER}\ \langle \boxed{1},\ldots,\boxed{n}\rangle\end{array}\right]\\ \text{SUBJ}\ \langle\rangle\\ \text{SPR}\ \langle\rangle\\ \text{COMPS}\ \langle\rangle\\ \text{SLASH}\ \Sigma 1\ \cup\ \ldots\ \cup\ \Sigma n\end{array}\right]\\ \text{N-HD-DTRS}\ \boxed{L}\textit{1-to-n-list}\left\langle\left[\text{SYNSEM}\ \boxed{1}\left[\text{SLASH}\ \Sigma 1\right]\right],\ldots,\left[\text{SYNSEM}\ \boxed{n}\left[\text{SLASH}\ \Sigma n\right]\right]\right\rangle\end{array}\right]$$

Now turning to the feature computation that arises when such constituents get coordinated, nothing more needs to be said to allow the variety of ACCs mentioned in §2(ii). ACCs of unlike categories such as (3c) repeated in (34a) will be dealt with just like ordinary coordinations of unlikes, i.e. by underspecifying within the CLUSTER head feature of the coordination as a whole the conflicting properties of the categories appearing on each conjunct's own CLUSTER feature. Assuming the first and the second conjunct in (34a) to be specified as in (34b) and (34c) respectively, one thus allows (among other resolutions) the coordination as a whole to be specified as in (34d) for its CLUSTER feature, with *cpltzer_ noun* as an appropriate supertype that subsumes *cpltizer* and *noun* in the hierarchy of HEAD values.

(34) a Les enseignants attendent des élèves qu'ils respectent le règlement et de leur proviseur un soutien sans faille. (PP-CP + PP-NP)
b [CLUSTER <[HEAD *prep*], [HEAD *cpltzer*]>]
c [CLUSTER <[HEAD *prep*], [HEAD *noun*]>]
d [CLUSTER <[HEAD *prep*], [HEAD *cpltzer_ noun*]>]

More interestingly, coordinations of clusters of different lengths such as (3d) repeated here in (35a) can also be accommodated by positing a *list* hierarchy as in figure 6. Let the first and the second conjunct in (35a) be partially specified as in (35b) and (35c) respectively, one allows (again among others resolutions) the ACC as whole to be specified as in (35d) for its CLUSTER feature, hence providing the amount of underspecification needed.

[10] A default constraint should be stated in order to prevent signs in general from having a non-empty list value for their CLUSTER feature. We leave this aside here.

(35) a Paul écrira un petit poème et une lettre à sa mère (NP+NP-PP)
b [CLUSTER <NP>+*elist*]
c [CLUSTER <NP>+*1-list*(PP)]
d [CLUSTER <NP>+*0-to-1-list*(PP)]

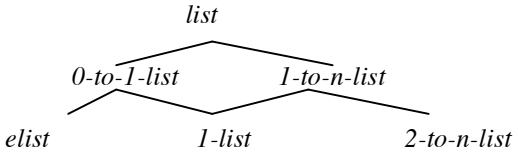

Figure 6

5.3 Argument cluster coordinations as complements

Turning to the final step of our syntactic analysis, we posit a valence-changing lexical rule (mapping words to words) that allows a given predicate to be partially saturated by an ACC. We formulate it in (36) as a post-inflectional lexical construction replacing some non-empty sublist of complements in the COMPS of the input word by an ACC (i.e. a description that is specified as [COORD+] and has a non-empty list value for its CLUSTER feature) in the COMPS of the output word. Note that the sublist to be replaced cannot correspond itself to a single ACC, hence preventing infinite recursion.

(36)
$$\left[\begin{array}{l} \textit{acc-post-inflec-lex-cx} \\ \text{INPUT}\left[\begin{array}{l}\textit{word}\\ \text{COMPS } \boxed{\text{L1}} + \boxed{\text{L2}}\ \textit{1-to-n-list}\langle[\text{CAT } \boxed{1}],\ldots,[\text{CAT } \boxed{n}]\rangle\end{array}\right] \\ \text{OUTPUT}\left[\begin{array}{l}\textit{word}\\ \text{COMPS } \boxed{\text{L1}} + \langle\left[\begin{array}{l}\text{COORD+}\\ \text{CLUSTER}\langle[\text{CAT } \boxed{1}],\ldots,[\text{CAT } \boxed{n}]\rangle\end{array}\right]\rangle\end{array}\right] \end{array}\right]$$
$$\wedge \boxed{\text{L2}} \neq \langle\left[\begin{array}{l}\text{COORD +}\\ \text{CLUSTER } \textit{1 - to - n - list(synsem)}\end{array}\right]\rangle$$

This lexical construction achieves three main results. First note that it crucially introduces the ACC in the COMPS list. Assuming, as is standard within HPSG, that the COMPS list only contains *canonical-synsem* elements as opposed to the ARG-ST of words which may also contain gaps and pronominal affixes (i. e. *non-canonical synsem* elements), rule (36) correctly predicts that ACC cannot be extracted or cliticized (see (24)). This is how we propose to capture the 'non-constituent' properties of ACC.

Second, since only local elements appear in the COMPS sublist that is replaced in (36), long-distance ACC is also correctly prevented (see §2(iii)) without locating any constraint in argument clusters themselves (recall that clusters of non-sister constituents may arise in gapping constructions, see (6b)).

Finally, note that the ACC replacing the sublist [L2] in (36) preserves the syntactic CAT properties of the original complements in its CLUSTER feature. This is how Wasow's generalization is captured. Let the syntactic properties of the original complements be maximally specified and argument cluster conjuncts will be required to be parallel. Let on the other hand those properties remain partially underspecified and the variety of non-parallel ACCs will be allowed to occur. Consider for example a verb like *écrira* and suppose it is specified for a simplified COMPS list as in (37a). The rule in (36) allows for an alternative entry with a COMPS list of the form (37b), hence providing the appropriate environment for an ACC with conjuncts of different length as in (35a/d) to occur (see figure 7).

(37) a écrira$_1$: [COMPS <NP> + [1], *0-to-1-list*(PP) ≤ [1]]

b écrira$_2$: [COMPS < [COORD+ ; CLUSTER < NP > +[1] | *0 - to - 1 - list*(PP) ≤ [1]] >]

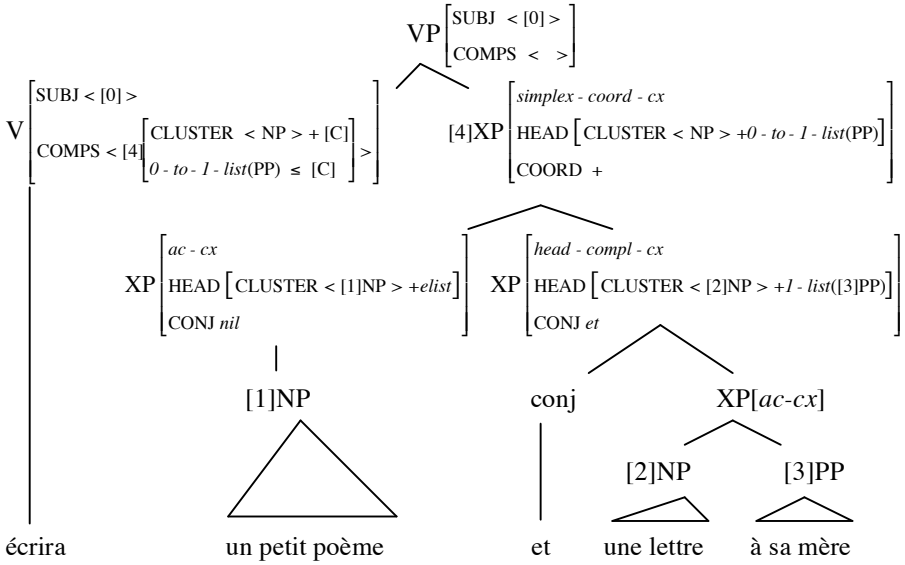

figure 7

We conclude this section by noting that the agreement phenomena discussed in §4.3 can be accounted for by the additional constraint in (38).

(38) ([INPUT [CONCORD | NUM [N] ; COMPS [L1] + [L2] <..., [INDEX | NUM [N]], ...>]]) →

([OUTPUT [COMPS [L1] + < [CLUSTER <..., [INDEX | NUM [N]], ...>] >]]

∨ [N] = *plural*)

Read in conjunction with (36), such a constraint states that if the input entry agrees with one of its complements (i. e with some postverbal 'subject'), then either the output entry preserves this constraint in its CLUSTER list (hence enforcing the first agreement strategy) or the verb is plural whatever the index number value of each cluster's corresponding complement (hence allowing the second agreement strategy).

6. Conclusion

Taking French as our object language in this paper, we have provided theory-neutral arguments against analyses that appeal to ellipsis to account for ACC. As we have shown, neither a deletion-based approach (which might be the right solution for Right-Node-Raising constructions), nor a substitutional one (which might be the right solution for Gapping) is empirically appropriate. Focussing on syntactic issues, we have then explored an alternative approach within HPSG that eschews ellipsis by allowing non-standard constituents to be conjoined in the scope of some shared predicate. While such non-standard constituents are generally obtained by relaxing phrase structure, we propose analyzing them as non-headed constituents, deriving their unusual properties from the interplay of two different sets of constraints: those imposed by coordination and those imposed by predicates that select such clusters as arguments. It remains to be seen how our analysis can be paired with a proper syntax-semantics interface.

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