The Operational Annotation and the Analysis of the Correlative Coordination in French

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Abstract

Despite extensive theoretical work carried out on coordination during the last three decades, much research is still devoted to proving the merits of one model over another. In our article, we will show how the coordination process in French (with using the conjunction *et* (*and*)) can be explained through Applicative and Combinatory Categorial Grammar (ACCG). We, especially, describe the analysis of the correlative coordination and its operational annotation.

Introduction

Coordination is, probably, the linguistic phenomenon more studied in descriptive, comparative or formal linguistics and even in artificial intelligence. A complete classification of coordination is, almost always, called into question with new examples which seem not to integrate the existing models of analyses, or not to have a sufficient formal description.

The coordinated elements are generally of the same nature and fulfill the same function (example i). However, it is not rare to encounter cases of coordination of elements that are different in nature though identical in function (example ii) or some cases of coordination of elements of different natures and different functions (example iii).

i. *Jean admire les hommes courageux et les femmes cultivées*
(*Jean admires the courageous men and the cultivated women*)
ii. *Le touriste regarde ce lion toujours immobile et qui semble dormir*
(*The tourist looks at this lion, still motionless and which seems to be asleep*)
iii. *Pat est un républicain et fier de l'être*
(*Pat is a republican and proud of it*)
iv. Jean aime Marie tendrement et Sophie sauvagement
(*Jean Loves Marie madly and Sophie wildly*)
v. Jean aime et Marie tendrement et Sophie sauvagement
(*Jean likes both Marie madly and Sophie wildly*)
vi. Le livre intéresse et les étudiants intelligents et les professeurs persévérants
(*The book interests both the intelligent students and the perseverant professors*)
vii. Le drapeau canadien est rouge et blanc
(*The Canadian flag is white and red*)
viii. Un petit tour au casino et tu te retrouves ruiné
(*A brief stop at the casino, and you end up ruined*)
ix. Je te dis un mot et je m'en vais
(*I'll say a word and I'll leave*)

Although the previous distinctions are important to determine the scope of the model, they are insufficient for the researchers who focus on yet other distinctions : coordination of constituents (i) versus coordination of non-constituents (iv), correlative coordination (v) versus simple coordination, distributive coordination versus non-distributive coordination (vii) (The statement does not mean: *Le drapeau canadien est rouge et le drapeau canadien est blanc* (*The canadian flag is red and the canadian flag is white*)) and coordination that expresses causality (viii) or temporality (ix).

We presented in our previous articles the analyses of several of these constructions by means of a categorial grammar (Biskri, Desclés, 1997, 2006). We will be interested in our article in correlative coordination.

The Correlative Coordination

The correlative coordination (v), in opposition to the simple coordination (iv) where the conjunction appears in front of the last element and optionally between the other elements of coordination which precede it, makes the conjunction appearing in front of the first member of coordination and obligatorily in front of each member who follows it.

Very few studies were devoted to the correlative coordination, particularly, in french. Some work is, however, listed for english with the generative current

(Sag, 2005; Schwarz, 1999; Hendriks, 2004), from the point of view of translinguistic generalization Johannessen, 2005; Zoerner, 1999; De Vries, 2005). Other studies are still too recent and restricted with only coordinations of constituents. These studies made it possible to better understand correlative coordinations. Thus, we learn that they observe the same constraints of parallelism as simple coordinations. They must share the syntactic properties imposed by the context of appearance of the elements coordinated, and lastly they can connect not only constituents (vi) but also non-constituents (v).
We find two diagrams for the analysis of the correlative coordination:

- A symmetrical analysis (Piot, 2000; Sag, 2005; Progovac, 1998) for which each member of coordination is introduced by the same conjunction;
- An asymmetrical analysis (Johanessen, 2005; Hendriks, 2004) which consists in regarding the initial conjunction as an adverbial modifier.

Critics were formulated. Thus, some reject, categorically, the fact of recognizing to the initial conjunction an adverbial function, because of constraints of prosody. Others reproach to the symmetrical analysis the fact of considering the initial conjunction as a coordinating head whereas this one does not coordinate (Johanessen, 2005) and that within the framework of the X-bars theory the conjunction must necessarily take two arguments: a complement and a specifier. In (Zoerner, 1999) it is established that the initial conjunction is a marker of distribution and does not coordinate because of the absence of a first member. This argument "militates" for a hierarchical structure of coordination. At Last, an important argument is given in (Johanessen, 2005), the presence of an initial conjunction is strongly related to the presence of a non-initial conjunction.

Applicative Combinatory Categorial Grammar, Applicative Systems and Combinators

The formalism of the categorial Grammars, the applicative systems, the combinators and their reduction process are effective, fertile and sufficiently powerful concepts to precisely formulate assumptions on the nature of the markers of coordination. Each analysis of coordination is reduced to its normal form which makes it possible to analyze functional semantic interpretation of it and to create paraphrastic classes. The unicity of the normal form is guaranteed by the theorem of Church Rosser.
We think that this approach presents an alternative more in agreement with the empirical facts and especially with the requirements of formalization. As in the case of work on the passivisation and the reflexivisation in french (Desclés et al, 1985) and in bulgarian one (Guentcheva, 1997), we think that the markers of coordination are constrained operators who are translated, in a logical level of representation, in expressions of the combinatory logic. It is consequently possible to emphasize the invariants common to the various forms which coordination takes, but also to come to a classification of the conjunctions according to whether they are distributive, or having causal, temporal or different semantic contents.
The linguistic models of Universal Applicative Grammar (Shaumyan, 1998) and its extension Applicative and Cognitive Grammar (Desclés, 1990, 1996) insist in a very explicit way on the relevance of the levels of representations of the languages with interaction between these different levels. Their main goal is a study of the formal properties of the linguistic systems, and an analysis of their logic structures. These two models postulate three levels of representations: (i) the level of the phenotype, where the particular characteristics of the language are expressed (for example the word order, morphological cases, etc). It is the observable representation of the language; (ii) the level of the genotype, where the predicative structures subjacent with the phenotypical statements are expressed. The level of genotype is represented by an applicative semiotic system used like formal meta-language to describe the language. It makes it possible to express the functional semantic interpretation of the statements in which each linguistic unit is an operator followed by its operands; (iii) the cognitive level, where the meaning of the linguistic predicates is given (Desclés, 1997). The three levels use the same formalism: the combinatory logic (Curry et al., 1958). This logic is an applicative system without variables. It uses abstract operators who are combinators and β-expansion and β-reduction rules wich allow an algebraic calculus on combinators. We present here combinators **B**, **Φ**, **C*** (u1, u2, u3, u4 being given linguistic units):

$$((\mathbf{B}\ u1\ u2)\ u3) \rightarrow (u1\ (u2\ u3))$$
$$((\mathbf{C^*}\ u1)\ u2) \rightarrow (u2\ u1)$$
$$((\mathbf{\Phi}\ u1\ u2\ u3)\ u4) \rightarrow (u1\ (u2\ u4)(u3\ u4))$$

It is within this general framework that the model of Applicative Combinatory Categorial Grammar (ACCG) is integrated (Biskri, Desclés, 1997; Biskri, 2005). This model, like the whole of the other categorial models (Steedman, 2000; Dowty, 2000; Moortgat, 1997; Morrill, 1994; Baldridge, Kruijff, 2003), falls under a paradigm for the analysis of languages which allows a complete abstraction of the grammatical structure than its linear representation and, also, a complete abstraction of grammar than its lexicon. It conceptualizes the languages like organized systems of linguistic units (words, morphemes, lexemes, etc) of which some function like operators whereas others function like operands. It makes it possible to explicitly connect the expression of the phenotype to its subjacent representation of the genotype, on the one hand, and to seek at the cognitive level the meaning of the linguistic predicates, on the other hand. It is, thus, possible for us to implement a linguistic process which enables us to carry out in an effective way the translation of observable texts of a current language in a formal ideographic language of the combinatory logic with universal properties. The expressions of this ideographic language, it does not matter the translated language, have a normal form which is useful, mainly, to clarify the conditions of the correctness of the sentences, but also to extract “paraphrastic classes”. In the case of coordination, the conjunctions are regarded as predicates being able to be expressed at the cognitive level as complex combinatory operators through “semantico-cognitive schemes”.

ACCG, like all Categorial Grammar models, assigns syntactical categories to each linguistic unit. Syntactical categories are orientated types developed from basic types and from two constructive operators ‘/’ and ‘\’ :

(i) N (nominal syntagm) and S (sentence) are basic types.

(ii) If X and Y are orientated types then X/Y and X\Y are orientated types. According to Steedman's notation (2000), X/Y and X\Y are functional orientated types. A linguistic unit 'u' with the type X/Y (respectively X\Y) is considered as operator (or function) whose typed operand Y is positioned on the right (respectively on the left) of operator.

In our paper, a linguistic unit u with orientated type X will be designed by ‘[X : u]’.

Let us provide now ACCG rules used in this paper. To see the whole of the rules the reader might have a look on (Biskri, Desclès, 1997):

Application rules :	[X/Y : u_1] - [Y : u_2] ----------------------------> ; [X : (u_1 u_2)]	[Y : u_1] - [X\Y : u_2] --------------------------< [X : (u_2 u_1)]
Type-raising rules :	[X : u] ------------------------>**T** [Y/(Y\X) : ($\mathbf{C}_*$ u)]	
composition rules Functional:	[X/Y : u_1]-[Y/Z : u_2] ------------------------->**B** [X/Z : (**B** u_1 u_2)]	

The premises in each rule are concatenations of linguistic units with orientated types considered as being operators or operands, the consequence of each rule is an applicative typed expression with an eventual introduction of one combinator. The type-raising of an unit u introduces the combinator $\mathbf{C}_*$; the composition of two concatenated units introduces the combinator **B**.

Let us deal with this first example with a non-correlative coordination : *Jean aime Marie tendrement et Sophie Sauvagement* (*Jean Loves Marie madly and Sophie wildly*).

1 [N: Jean] - [(S\N)/N : aime]-[N : Marie] - [(S\N)\(S\N) : tendrement]-[(X\X)/X : et]-[N : Sophie]-[(S\N)\(S\N) : sauvagement]
2 [S/(S\N) : (C* Jean)] - [(S\N)/N : aime]-[N : Marie] - [(S\N)\(S\N) : tendrement] - [(X\X)/X : et] - [N : Sophie] - [(S\N)\(S\N) : sauvagement] (>T)
3 [S/N : (B (C* Jean) aime)] - [N : Marie] - [(S\N)\(S\N) : tendrement] - [(X\X)/X : et] - [N : Sophie] - [(S\N)\(S\N) : sauvagement](>B)
4 [S : ((B (C* Jean) aime) Marie)] - [(S\N)\(S\N) : tendrement] - [(X\X)/X : et] - [N : Sophie] - [(S\N)\(S\N) : sauvagement] (>)
5 [S : ((C* Jean) (aime Marie))] - [(S\N)\(S\N) : tendrement] - [(X\X)/X : et] - [N : Sophie] - [(S\N)\(S\N) : sauvagement]
6 [S/(S\N) : (C* Jean)] – [S\N : (aime Marie)] - [(S\N)\(S\N) : tendrement] - [(X\X)/X : et] - [N : Sophie] - [(S\N)\(S\N) : sauvagement]
7 [S/(S\N) : (C* Jean)] – [S\N : (tendrement (aime Marie))] - [(X\X)/X : et] - [N : Sophie] - [(S\N)\(S\N) : sauvagement] (<)
8 [S:((C* Jean) (tendrement (aime Marie))]-[(X\X)/X : et]-[N:Sophie]-[(S\N)\(S\N):sauvagement] (>)
9 [S:((C* Jean) (tendrement (aime Marie))]-[(X\X)/X : et]-[(S\N)\((S\N)/N):(C*Sophie)]-[(S\N)\(S\N):sauvagement] (<T)
10 [S:((C*Jean) (tendrement (aime Marie))]-[(X\X)/X : et]-[(S\N)\((S\N)/N):(B sauvagement (C* Sophie))] (<B)
11 [S/(S\N):(C* Jean)]-[S\N:(tendrement (aime Marie))]-[(X\X)/X : et]-[(S\N)\((S\N)/N):(B sauvagement (C* Sophie))]
12 [S/(S\N):(C* Jean)]-[S\N:((B tendrement (C* Marie)) aime)]-[(X\X)/X : et]-[(S\N)\((S\N)/N) : (B sauvagement (C* Sophie))]
13 [S/(S\N) : (C*Jean)]-[(S\N)/N:aime]-[(S\N)\((S\N)/N) : (B tendrement (C* Marie))]-[(X\X)/X : et]-(S\N)\((S\N)/N) : (B sauvagement (C* Sophie))]
14 [S/(S\N) : (C*Jean)]-[(S\N)/N:aime]-[(S\N)\((S\N)/N) : (B tendrement (C* Marie))]-[((S\N)\((S\N)/N))\((S\N)\((S\N)/N)) : (et (B sauvagement (C* Sophie)))] (>)
15 [S/(S\N) : (C*Jean)]-[(S\N)/N:aime]-[(S\N)\((S\N)/N) : ((et (B sauvagement (C* Sophie))) (B tendrement (C* Marie)))] (<)

16 [S/(S\N) : (**C***Jean*)] - [(S\N) : (((*et* (**B** *sauvagement* (**C*** *Sophie*))) (**B** *tendrement* (**C*** *Marie*))) *aime*)] (<)
17 [S : ((**C***Jean*) (((*et* (**B** *sauvagement* (**C*** *Sophie*))) (**B** *tendrement* (**C*** *Marie*))) *aime*))] (>)

18 ((**C***Jean*) (((*et* (**B** *sauvagement* (**C*** *Sophie*))) (**B** *tendrement* (**C*** *Marie*))) *aime*))
19 ((((*et* (**B** *sauvagement* (**C*** *Sophie*))) (**B** *tendrement* (**C*** *Marie*))) *aime*) *Jean*) **C***
20 ((((Φ ∧ (**B** *sauvagement* (**C*** *Sophie*))) (**B** *tendrement* (**C*** *Marie*))) *aime*) *Jean*) **(et = Φ ∧)**
21 ((∧ ((**B** *sauvagement* (**C*** *Sophie*)) *aime*) ((**B** *tendrement* (**C*** *Marie*)) *aime*)) *Jean*) **Φ**
22 ((∧ (*tendrement* ((**C*** *Marie*) *aime*)) ((**B** *sauvagement* (**C*** *Sophie*)) *aime*)) *Jean*) **B**
23 ((∧ (*tendrement* (*aime Marie*)) ((**B** *sauvagement* (**C*** *Sophie*)) *aime*)) *Jean*) **C***
24 ((∧ (*tendrement* (*aime Marie*)) (*sauvagement* ((**C*** *Sophie*) *aime*))) *Jean*) **B**
25 ((∧ (*tendrement* (*aime Marie*)) (*sauvagement* (*aime Sophie*))) *Jean*) **C***

First of all, this sentence is ambiguous. Two interpretations are possible. The first one is : *Jean aime Marie tendrement et Jean aime Sophie sauvagement* (*Jean loves Marie madly and Jean loves Sophie wildly*). The second one is : *Jean aime Marie tendrement et Sophie aime Marie sauvagement* (*Jean loves Marie madly and Sophie loves Marie wildly*). We chose to present the analysis which carries out towards the first interpretation to facilitate the reading of this paper.

Thus, the analysis starts with the assignment of the syntactic categories to the lexemes. For recall, each syntactic category describes the way in which a lexeme operates on its arguments. The category (X\X)/X assigned to the conjunction is in fact a scheme of type which describes the conjunction like an operator whose first and second operands, of type X, are respectively the second member and the first member of the coordination. The type of the coordination (S\N)\((S\N)/N) which will be substituted to X is known after the construction of the second member of coordination (step 10).

Steps 1 to 17 represent the application of ACCG rules. With these steps we verify the correctness of the sentence (the type S obtained at 17).

A first structural reorganization is applied at steps 5 and 6 in order to extract the operand of *tendrement*. A second structural reorganization is applied at steps 11, 12 and 13 in order to extract the first member of the coordination. The structural reorganization (Biskri, Desclés, 1997) is based mainly on the reduction and/or the introduction of some combinators into a combinatory expression to give an equivalent but differently structured combinatory expression.

Steps 18 to 25 are in the genotype level. They reduce combinators in order to construct the functional semantic interpretation (the normal form): ((∧ (*tendrement* (*aime Marie*)) (*sauvagement* (*aime Sophie*))) *Jean*), which is structured like a conjunctive clause. At the step 20 the linguistic predicate *et* (and) is replaced by its meaning in the cognitive level **Φ** ∧ in order to express the distributive and the conjunctive nature of et by respectively the combinator **Φ** and the logical connector ∧**.**

Let us notice, that the other possible interpretation of the statement would have corresponded to the following predicative structure: (∧ ((*tendrement* (*aime Marie*)) jean) ((*sauvagement* (*aime Marie*)) Sophie))

The next example, *Jean aime et Marie tendrement et Sophie sauvagement* (*Jean loves both Marie madly and Sophie wildly*), introduces a correlative coordination. We note the initial conjunction by *et1* and the non-initial conjunction by *et2* to avoid confusing them.

1 [N: *Jean*] - [(S\N)/N : *aime*]- [(X/(X\X))/X : *et1*]-[N : *Marie*] - [(S\N)\(S\N) : *tendrement*]-[(X\X)/X : *et2*]-[N : *Sophie*]-[(S\N)\(S\N) : *sauvagement*]
2 [S/(S\N) : (**C*** *Jean*)] - [(S\N)/N : *aime*]-[(X/(X\X))/X : *et1*]- [N : *Marie*] - [(S\N)\(S\N) : *tendrement*] - [(X\X)/X : *et2*] - [N : *Sophie*] - [(S\N)\(S\N) : *sauvagement*] **(>T)**
3 [S/N : (**B** (**C*** *Jean*) *aime*)] -[(X/(X\X))/X : *et1*] - [N : *Marie*] - [(S\N)\(S\N) : *tendrement*] - [(X\X)/X : *et2*] - [N : *Sophie*] - [(S\N)\(S\N) : *sauvagement*] **(>B)**
4 [S/N : (**B** (**C*** *Jean*) *aime*)] -[(X/(X\X))/X : *et1*] - [(S\N)\((S\N)/N) : (**C*** *Marie*)] - [(S\N)\(S\N) : *tendrement*] - [(X\X)/X : *et2*] - [N : *Sophie*] - [(S\N)\(S\N) : *sauvagement*] **(<T)**
5 [S/N : (**B** (**C*** *Jean*) *aime*)] -[(X/(X\X))/X : *et1*] - [(S\N)\((S\N)/N) : (**B** *tendrement* (**C** * *Marie*))] - [(X\X)/X : *et2*] - [N : *Sophie*] - [(S\N)\(S\N) : *sauvagement*] **(<B)**
6 [S/N : (**B** (**C*** *Jean*) *aime*)] -[((S\N)\((S\N)/N))/(((S\N)\((S\N)/N)))\ ((S\N)\((S\N)/N))) : (*et1* (**B** *tendrement* (**C** * *Marie*)))] - [(X\X)/X : *et2*] - [N : *Sophie*] - [(S\N)\(S\N) : *sauvagement*] (>)
7 [S/N : (**B** (**C*** *Jean*) *aime*)] -[((S\N)\((S\N)/N))/((S\N)\((S\N)/N))) : (**B** (*et1* (**B** *tendrement* (**C** * *Marie*))) *et2*)] - [N : *Sophie*] - [(S\N)\(S\N) : *sauvagement*] **(>B)**
8 [S/N : (**B** (**C*** *Jean*) *aime*)] -[((S\N)\((S\N)/N))/((S\N)\((S\N)/N))) : (**B** (*et1* (**B** *tendrement* (**C** * *Marie*))) *et2*)] - [(S\N)\((S\N)/N) : (**C***Sophie*)] - [(S\N)\(S\N) : *sauvagement*] **(<T)**
9 [S/N : (**B** (**C*** *Jean*) *aime*)] -[((S\N)\((S\N)/N))/((S\N)\((S\N)/N))) : (**B** (*et1* (**B** *tendrement* (**C** * *Marie*))) *et2*)] - [(S\N)\((S\N)/N) : (**B** *sauvagement* (**C***Sophie*))] **(<B)**

10 [S/N : (**B** (**C*** *Jean*) *aime*)] -[(S\N)\((S\N)/N) : ((**B** (*et1* (**B** *tendrement* (**C** * *Marie*))) *et2*) (**B** *sauvagement* (**C****Sophie*)))] (>)
11 [S/(S\N) : (**C*** *Jean*)] - [(S\N)/N : *aime*]- [(S\N)\((S\N)/N) : ((**B** (*et1* (**B** *tendrement* (**C** * *Marie*))) *et2*) (**B** *sauvagement* (**C****Sophie*)))]
12 [S/(S\N) : (**C*** *Jean*)] - [(S\N) : (((**B** (*et1* (**B** *tendrement* (**C** * *Marie*))) *et2*) (**B** *sauvagement* (**C****Sophie*))) *aime*)] (<)
13 [S : ((**C*** *Jean*) (((**B** (*et1* (**B** *tendrement* (**C** * *Marie*))) *et2*) (**B** *sauvagement* (**C****Sophie*))) *aime*))] (>)

14 ((**C*** *Jean*) (((**B** (*et1* (**B** *tendrement* (**C** * *Marie*))) *et2*) (**B** *sauvagement* (**C****Sophie*))) *aime*))
15 ((((**B** (*et1* (**B** *tendrement* (**C*** *Marie*))) *et2*) (**B** *sauvagement* (**C****Sophie*))) *aime*) *Jean*) **C***
16 (((*et1* (**B** *tendrement* (**C*** *Marie*))) (*et2* (**B** *sauvagement* (**C****Sophie*)))) *aime*) *Jean*) **B**
17 (((**C*** (**B** *tendrement* (**C*** *Marie*))) (*et2* (**B** *sauvagement* (**C****Sophie*)))) *aime*) *Jean*) ***et1* = C***
18 (((*et2* (**B** *sauvagement* (**C****Sophie*))) (**B** *tendrement* (**C*** *Marie*))) *aime*) *Jean*) **C***
19 ((Φ ∧ (**B** *sauvagement* (**C****Sophie*))) (**B** *tendrement* (**C*** *Marie*))) *aime*) *Jean*) ***et2* = Φ ∧**
20 ((∧ ((**B** *sauvagement* (**C****Sophie*)) *aime*) ((**B** *tendrement* (**C*** *Marie*)) *aime*)) *Jean*) **Φ**
21 ((∧ (*sauvagement* ((**C****Sophie*) *aime*)) ((**B** *tendrement* (**C*** *Marie*)) *aime*)) *Jean*) **B**
22 ((∧ (*sauvagement* (*aime Sophie*)) ((**B** *tendrement* (**C*** *Marie*)) *aime*)) *Jean*) **C***
23 ((∧ (*sauvagement* (*aime Sophie*)) (*tendrement* ((**C*** *Marie*) *aime*))) *Jean*) **B**
24 ((∧ (*sauvagement* (*aime Sophie*)) (*tendrement* (*aime Marie*))) *Jean*) **C***

First of all, this sentence is not ambiguous. Only one interpretation is possible. This interpretation is *Jean aime Marie tendrement et Jean aime Sophie sauvagement* (*Jean loves Marie madly and Jean loves Sophie wildly*). We note, thus, that the initial conjunction eliminates the ambiguity noticed in the example *Jean aime Marie tendrement et Sophie Sauvagement* (*Jean Loves Marie madly and Sophie wildly*). This is due to the fact that the first member of coordination is delimited by the first conjunction *et1* (initial one) and the second conjunction (coordinating one) *et2*. A consequence of that: the category of the coordination is obtained after the construction at step 5 of the first member of coordination (**B** *tendrement* (**C** * *Marie*)) with the type (S\N)\((S\N)/N).
The category (X/(X\X))/X is assigned to the initial conjunction *et1* in order to express its role of operator whose first operand is the first member [*Marie tendrement*] of the coordination and the second member is the result of the application of the coordinating conjunction *et2* to the second member [*et Sophie sauvagement*]. This category is in agreement with the fact that the presence of an initial conjunction is strongly dependent on the presence of a non-initial conjunction. However, it makes it possible to classify our analysis neither in the class of the symmetrical analysis nor in the class of the asymmetrical analysis as described in the literature. Indeed, on the one hand this category is different from the category assigned with the non-initial conjunction and thus defines the conjunction initial as not-coordinating, and on the other hand it is not compatible with the category of an adverb.
The second conjunction *et2* which is coordinating still have the scheme of type (X\X)/X.
Steps 14 to 24 are in the genotype level. They reduce combinators in order to construct the functional semantic interpretation: ((∧ (*tendrement* (*aime Marie*)) (*sauvagement* (*aime Sophie*))) *Jean*), which is structured like a conjunctive clause too. This functional semantic interpretation is exactly the same as the one produced following the analysis of *Jean aime Marie tendrement et Sophie Sauvagement* (*Jean Loves Marie madly and Sophie wildly*). At the step 17 the linguistic predicate *et1* (and) is replaced by its meaning in the cognitive level **C***. *et1* is not a coordinating conjunction. It is just an operator who "types raise" the first member of coordination to produce a complex operator (*et1* (**B** *tendrement* (**C*** *Marie*))) whose operand is the result (*et2* (**B** *sauvagement* (**C****Sophie*))) of the application of the coordinating conjunction *et2* to the second member of coordination (**B** *sauvagement* (**C****Sophie*)).
At the step 19 the linguistic predicate *et2* (and), because of its distributive and conjunctive nature, is replaced by its meaning **Φ** ∧ in the cognitive level.

In short, the initial conjunction does not function like a simple conjunction. It is different by its not coordinating nature. It is mainly useful to reinforce coordination, either by eliminating ambiguity or by determining the first member from coordination as well as the type of coordination. The analysis of correlative coordination is asymmetric, even if the initial conjunction does not function like an adverb

Within the categorial model, the scheme of the type of the initial conjunction is (X/(X\X))/X, and the one of the coordinating conjunction is (X\X)/X. These two types allow skipping steedman's coordination rule from our model and thus to reduce it. They allow, also, a better classification of the conjunction *et* according to a certain hierarchy to establish.
On the other hand, the meaning of the initial coordination and the coordinating one, in the cognitive level are respectively expressed by the combinatory expressions **C*** and **Φ** ∧. This proves, in a general way, that the language is not just a linear succession of linguistic units. Certain units function like complex operators. It is useful to formalise their meaning. The model of representation of the language with three levels (phenotype/genotype/ cognitive) is in adequacy with this reality.

Conclusion

With this work, it arises several fundamental results. From a theoretical point of view, with the ACCG, thanks to the use of the combinatory logic, we prove, on concrete examples, that it is a very solid formalism and very flexible device for the analysis of simple or correlative coordination. It also confirms that the initial conjunction is not coordinating and does not operate the same manner as a simple conjunction.

In the case of our formalism, the linear structure is not enough to make emerge the members of coordination. The categorial functions as well as the operators of the combinatory logic allow, starting from the concatenated structure of the statements, to build their true interpretation in functional term (operator/operand) and thus to emphasize the members of coordination who, in the functional expression of the genotype, are the arguments of the coordinating conjunction, the initial conjunction allowing only the identification of the first member of coordination and avoiding ambiguity in certain cases. We must then treat the various conjunctions (*et* (*and*) in our case) on a hierarchical base.

In addition, to consider the conjunction as an operator which is possible to express in "combinatory/predicative" logic, can spread with coordination with causal and/or temporal value, or with other markers of coordination like *aussi* (*too*).

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