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Analyzing Zeugmas in XLFG

(1) Le général a accusé une défaite et ses amis de le trahir.
The general has accused a defeat and his friends to him betray.
The general suffered defeat and accused his friends to betray him.
(2) Luc boit un Cointreau et un coup en trop
(3) Cet homme ne casse rien sinon mes pieds
(4) Prenez vos affaires et la porte !
(5) Nous étions ivres d'amour l'un et l'autre, elle pour son amant, moi pour elle. (Rousseau)
(6) Marie a pris et Jean a regretté la décision de partir.
(7) Il vient juste de manger une pomme et ses parents de prendre une bière.
(8) Il espérait juste de manger une pomme et ses parents de prendre une bière.
(9) Jean semblait vouloir forcer Pierre à sortir, et Marie Jules. (Jackendoff)
(10) # Marc pense que mon chien aime le pâté et Anne les os.
Marc thinks that my dog loves pâté and Anne the bones. (Anne cannot be the subject of *thinks*.)

As an illustration of the more general analysis of coordination in the French grammar written for the XLFG environment (Clément & Kinyon, LFG01), we expose in this article an LFG analysis and an XLFG implementation of zeugmas in French of the type shown in the above examples (1) to (10). We use the term *zeugma* in the wide sense of including "usual" gapping as well as syllepsis, i.e. the use of the same lemma with different meanings (e.g. idiomatic vs. literal reading) in coordinate or comparative constructions. We find it necessary to include sylleptic constructions in our grammar for different reasons: 1. Distinguishing "pure" zeugmas from sylleptic ones is difficult and acceptability varies considerably among speakers. 2. All types of zeugmas are a frequent phenomenon in all natural languages in particular in journalistic texts. 3. Even if we want to consider sylleptic cases as non-standard, we need a grammar describing this possibility of "play on words" and distinguishing them from impossible constructions (Note also that constructions like sentence (5) can have the same "surprising" effects although the same lexeme is reconstructed.) Lexical Functional Grammar is an appropriate framework as our description is based on the relation between the lexicon and functional dependencies. For this present short description we concentrate on gapping and we leave aside cases like (6) of so called right node raising, although they can be analyzed with a similar mechanism.
We describe a feature of our LFG analysis called "lexical capture". The goal is to analyze sentences like (1) where the same verb *accuser* enters a light verb construction in the first part of the sentence (*accuser* is the Oper_1 of *défaite* in Mel'cukian lexical functional terms) and a full verb when it is reconstructed in the second elliptic part of the sentence. These constructions show that 1. the reconstructed part does not carry the agreement features of the first conjunct, as has often been observed (see e.g. example (5)), but also 2. that the reconstruction cannot be based on the *Pred* feature, as they differ in both conjuncts, one being the predicative noun, the other the full verb. 3. If the two coordinated predicates refer to a verb, the idiomatic one does not necessarily have the same sub-categorization as the full verb.
The study of zeugmas reaches out to a general discussion of coordination and comparison, because it is common knowledge of grammar books that "when a same verb is repeated in two coordinated sentences, the second one can and sometimes must be gapped." But, as we have seen, the gapping is possible even for different acceptations of the same verbal lemma, even with different sub-categorization frames (and also with different morphological features) So what is the minimal relation between the two constructions? We postulate for this work that standard coordinations and comparatives are possible with the same lexeme, zeugmas with the same lemma, but not with the same form[1].

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[1] This kind of lexical zeugmas is the syntactic equivalent to morphological neutralizations as in (A) (See Sag 2003). Note the clear contrast with constructions like (B). The ungrammaticality of these latter examples seems to stem from the fact that the first and the reconstructed second lexeme are only homonymous. For gapping zeugmas, it seems to be necessary to have polysemic relations, like between light verbs and their full equivalent. In our grammar, we account for these (rare) homonyms by assigning different *lemma* values to the two lexemes.

(A) 1. German: Peter liebt und hilft Frauen (dative or accusative).
2. ? Jean mange et se souvient des madeleines.
Jean eats and himself recalls (∅/of the) madeleines
Jean eats and recalls (the) madeleines.
3. ? Jean compte et conduit tous les jours sur les routes de France.
Jean counts and drives every day on the streets of France.

(B) 1. ?* Marie vole comme un oiseau et Jean mon porte-monnaie.
Marie flies as a bird and John (steals) my purse. ('voler'=to fly and to steal)
2. * Luc a perdu et Anne un chien.
Luc has lost and Anne (has) a dog.
3. *Le soldat panse ses plaies et qu'il ne vivra point longtemps.
Intended meaning: *The soldier bandages his wounds and (thinks) that he will not live long.*
('panser' = to bandage, 'penser' = think with the same pronunciation)

Our solution for this type of lexical zeugmas consists of a simple formalization that shares only a so called *lemma* feature among the conjuncts, each of them being able to trigger different *Pred* values. We propose the introduction of *lexical capture* function *LEX*. The essential rules for the analysis of sentence (1) are the following:

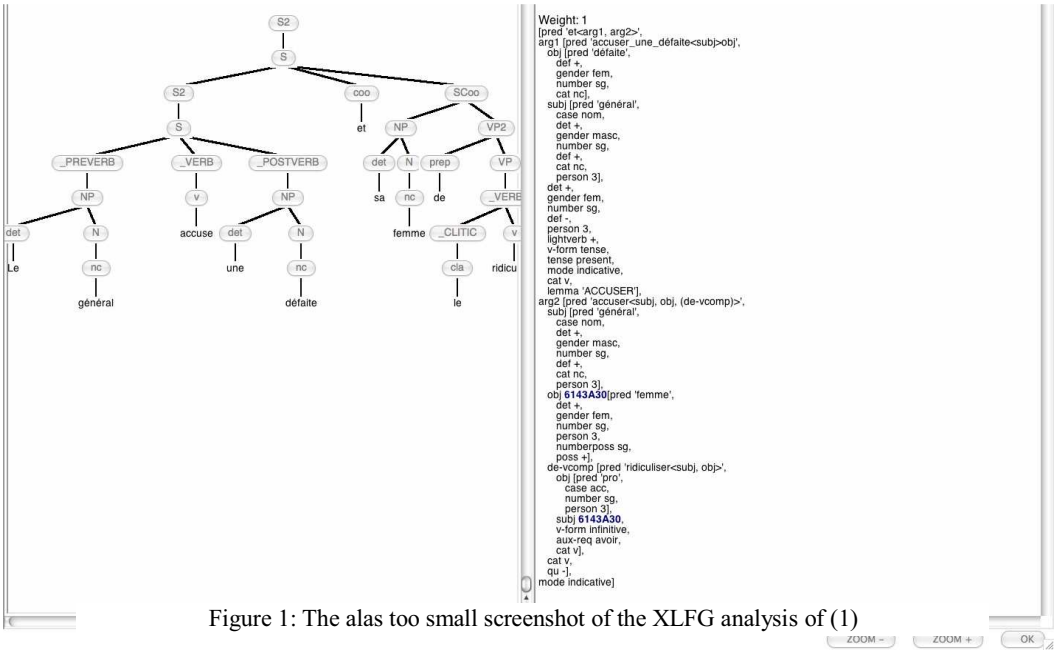

Figure 1: The alas too small screenshot of the XLFG analysis of (1)

S →	S2	coo	SCoo	SCoo →	NP	VPinf
	↓=↑arg1	↓=↑	↓=↑arg2		↓=↑subj	↓=↑xcomp* xcomp
	↓mode=↑mode		↓arg2=LEX(↑arg1)			

The LEX function copies the disjunction of all lexical entries sharing the same *lemma* value from the first conjunct into the second, where it can trigger all corresponding predicates, just as if the word form had appeared in this position. Moreover, we have to control which other features can be copied over. The basic approach is that all subsets of features can be copied over, most giving incoherent f-structures. Among those that allow obtaining coherent f-structures we may have to develop a OT style preference account that privileges bigger shared subsets as illustrated in sentence (7) which has a clear preference for the (theoretically optional) sharing of the adverbial *juste/just*. Two further comments to these rules are in order:

The first rule shows that we consider the coordinative conjunction as the (syntactic) head of the coordinated sentence (although this head is purely functional just like case marking prepositions). This is in contradiction with the (standard) Kaplan & Maxwell 88 analysis that has the following disadvantages: 1. They introduce sets instead of regular feature structures, and this extension implies an increase of the semantics of functional equation that have to cross sets. 2. The coordinated sentences do not possess a predicate although the structure has to carry its own morphological features (for agreement). 3. If we wanted to attribute a predicate to comparative constructions, their analysis would differ considerably from the analysis of coordination in spite of the commonly observed parallelism of the two phenomena.

The underspecified path of the *xcomp* feature in the second rule allows us to place a missing complement at any depth of a chain of *xcomps*. Example (9) shows that the completion of the reconstructed predicate can intervene at any (also intermediate) level. However, it is easy to control island constrains as observable in (10) by simply not allowing *comp* chains in the reconstruction.[2]

The sentence (7) shows another remarkable feature of gapping: Auxiliaries seem to behave in coordination very similarly to raising or control verbs (see the parallel construction in (8)). In classical LFG analysis, auxiliaries are depraved of *Pred* values because of their different semantic structure. This seems to corroborate the proposal of Clément et al. LFG02 for German that introduces a clear distinction of (surface) syntax and semantic parts of f-structure, because, if *venir* (near past auxiliary) is analyzed as a regular verb we do not need any extra rule for its reconstruction in the second conjunct.

For lack of space we cannot discuss other benefits and side effects of our analysis of French coordination, but we hope to have shown how an analysis of (one type of) zeugmas can be made possible and effectively implemented in a middle scale XLFG grammar without losing the declarativeness of the grammar (with its computational advantages). Coordination undergoes a lot of semantic and pragmatic constraints that are difficult to distinguish from the syntactic restrictions, and we are far from being able to give a global analysis of all known problems in this field. However, ongoing work aims to capture the most frequently encountered coordinative constructions.

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[2] Note that this constraint is rather astonishing as it contrasts with the usually permitted extraction out of sentential arguments in French as in *Ce sont les os que Anne pense que mon chien aime.' It's the bones that Ann thinks that my dog loves'.*