

Problems of German VP coordination

Martin Forst, Powerset/Microsoft & Christian Rohrer, IMS, University of Stuttgart

1 Introduction

Traditionally, generative grammarians working on German assume a binary right-branching VP that ends with a binary left-branching verb complex (Haider 2003, Berman 2003, Dipper 2003). While this approach can explain most of the data including coordination data, a non-negligible portion of coordinations involving verbs with arguments or adjuncts cannot be accounted for in this view —or only by recurring to notions like “Linkstilgung”.

In a grammar development perspective, this is problematic. Mechanisms like “Linkstilgung” are beyond the scope of current LFG parsing systems, coverage is of course negatively affected when certain phenomena are systematically not covered and —perhaps most problematically— a broad-coverage grammar is likely to analyze sentences that contain those phenomena in grossly erroneous ways, due to unrelated, potentially dispreferred, rules that can cover the sentence.

2 Coordinations involving verbs and their arguments or adjuncts in German

Coordinations of VPs that can be covered by the “traditional” account are illustrated in examples (1) and (2). What characterizes them is that two VPs, participial ones in (1) and infinitival ones in (2), are coordinated, but an additional argument occurring to the left of the coordination has to be distributed into the conjuncts. This distribution traditionally is one of the arguments for assuming a rightbranching VP, which we have bracketed in the glosses for illustration purposes.

- (1) *Nach* [...] *hatte* [*er* [[*eine Stewardess* [...] *bedroht*] *und* [*politisches Asyl verlangt*]]].
According to [...] had he a stewardess [...] threatened and political asylum demanded.
According to [...], he had threatened a stewardess [...] and demanded political asylum.¹
- (2) *Insofern soll* [*meine Präsenz* [[[...] *wirken*] *und* [*die Einsatzleitung bestärken*]]].
Insofar shall my presence [...] have an effect and the operation controllers encourage.
'Insofar, my presence is supposed to have an effect [...] and encourage the operation controllers.'

These coordinations are rather frequent in German newspaper corpora. Among the 48,470 TIGER Corpus sentences that are not used for evaluation (Sentences 8,001 through 10,000 are commonly set aside for that purpose.), 360 sentences contain this sort of VP coordination.

Another type of VP coordination can be found in examples (3) and (4). Characteristic of these coordinations is a verbal element at the right edge of the construction that has to be distributed over the conjuncts to make the first conjunct “complete”. This is something that cannot be captured by a recursively right-branching VP rule combined with a recursively left-branching verb complex because the verbal element that has to be distributed into the first conjunct ends up too low in the tree for this to happen. Only the c-structures indicated by the brackets in the examples can yield the necessary distribution of verbal elements over the conjuncts. Note that, just like in the examples above and to make matters more complex, there can be arguments to the left of the coordination that have to be distributed over the conjuncts to make the second conjunct complete; this is the case of the SUBJ *er* in (4).

- (3) *Die Regierung* [...] *wirft ihm vor*, [[[...] *zu dem Massenmord aufgerufen*] *und* [*Massaker organisiert*]] *zu haben*.
The government [...] accuses him [...] for the mass murder called and massacres organized to have.
'The government [...] accuses him of having called for the mass murder and of having organized massacres.'
- (4) *Doch Lafontaine weiß, daß* [*er* [[*Schröder einbinden*] *und* [*seine Talente nutzen*]] *muß*].
But Lafontaine knows that he Schröder involve and his talents use must.
But Lafontaine knows that he must involve Schröder and capitalize on his talents.

While these coordinations are less frequent than the first type, they are not negligible in number in newspaper corpora. 171 sentences in the non-evaluation part of the TIGER Corpus contain this second type of VP coordination. With the “traditional” VP implementation, these sentences can either not be associated with an analysis spanning the entire sentence or only be analyzed erroneously. The latter is actually worse sometimes because, as a consequence of a bad analysis of the coordinated verbs, large parts of the remainder of the sentence are typically analyzed erroneously, too, and the resulting analysis contains blatantly wrong predicate-argument triples.

¹The example sentences are from the TIGER Corpus.

3 Possible solutions to the problem

One possible way to resolve the “conflict” between argument/adjunct distribution from the left as illustrated in (1), (2), and (4) and verbal element distribution from the right as illustrated in (3) and (4) is to do away with the distinction between VPs and verbal complexes and simply assume a right-branching recursion that allows for the introduction of an argument/adjunct and a left-branching recursion for the introduction of an auxiliary or modal. This solution, however, encounters two important problems: From a theoretical point of view, it is problematic that, with this set of VP rule variants, there is no way to constrain the placement of arguments such as predicative phrases or directional PPs, which, unlike most other kinds of arguments in German, clearly have to be adjacent to the verb. From the point of view of grammar engineering, the problem with this solution is that, as soon as a clause has more than one element in clause-final position, the rules can produce several c-structures for identical f-structures, which is undesirable for efficiency reasons and with respect to ambiguity management.

Another way to obtain the desired f-structures, which makes it possible to avoid the vacuous c-structure ambiguities just mentioned, is to allow certain rule expansions only with coordinated VPs as opposed to other types of VPs. This means that instead of this rule²

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VP --> { @(VPconst) VP
        | VP Vaux
        | ... }.
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which produces vacuous c-structure ambiguities, we propose a VP rule like the following:

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VP --> { @(VPconst) VP-COORD
        | VP Vaux
        | ... }.
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VP-COORD is a category (or potentially a macro) that can only expand to a coordination of VPs, not to a simple VP, and its sole purpose is to make certain c-structures possible only with coordinated VPs. This category can be used to cover sentences like (3) and (4) without undesirable ambiguities, and actually it can be used both in a grammar that does away with the verb complex as a category and in a grammar that keeps it. In the latter case, however, VP-COORD has to be attached under the verb complex, which may seem somewhat counterintuitive although this solution does give rise to linguistically sound f-structures.

4 Further potential benefits of our solution

Apart from making it possible to cover the two types of VP coordination presented above, the rule we propose for German VPs has a number of further properties that are desirable from a grammar developer’s point of view. The most important one is that, with such a rule, arguments and adjuncts can be attached as sisters in a flat VP. This makes it much easier than with a recursive binary-branching VP rule to state hard constraints on the ordering of those arguments and adjuncts as well as to capture soft constraints on their ordering in the form of easily expressible, local learning features for statistical parse or realization ranking models.

5 Conclusions and future directions

We have proposed a solution for problematic cases of VP coordination in German which, to our knowledge, have not been treated in LFG so far. In future work, which we hope to conclude before the conference, we will investigate which implementations are the most general and accurate from a linguistic point of view and the most efficient in a technical perspective.

References

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²@(VPconst) stands for all sorts of argument/adjunct constituents that can appear in the German middlefield.