

Construction-based adjunct extraction

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1 Introduction

Certain modifier phrases can be extracted, as noted by Pollard and Sag (1994). This is the case of adverbial phrases and prepositional phrases, as illustrated below.

- (1) a. [On Monday], I think that [Kim went home very late _].
b. [Yesterday], it seems that [Kim arrived home very early _].
c. [How often] do you think that [Fred was late this week _]?
- (2) a. *[Tall], I saw the _ man.
b. *[Who shot the sheriff], I met the man _.

Pollard and Sag (1994, 387) propose a lexical rule that applies to verbs and adds adjuncts to SLASH. This account was later revised in Bouma et al. (2001). The latter assumes that post-verbal modifiers are in fact complements. And since these elements are complements, then adjunct extraction is handled in exactly the same way as the extraction of arguments.

The adverbs-as-complements analysis finds some cross-linguistic evidence in the literature, as noted in Bouma et al. (2001). However, this view is not without problems. First, there is no semantic sense in which these adverbs can be seen as verbal arguments.¹ Second, Levine (2003) notes that this analysis requires further assumptions in order to account for cases that would otherwise be standard VP adjunction, as in (3).

- (3) Nobody can [[drink four beers and eat two hotdogs] [under fifteen seconds]].

If the PP is a complement, then something else must be assumed in order to capture this sentence. For example, one would have to assume that the PP is extraposed ATB or Right-Node Raised. But these hypotheses are at odds with the semantic interpretation that the PP obtains, which ranges over the total time interval denoted by the two conjuncts. In contrast, this reading is trivially obtained if the PP simply adjoins to the conjoined VP.

- (4) Nobody can [[drink four beers]_{e₁} and [eat two hotdogs]_{e₂}]_{e₁+e₂} [under fifteen seconds].

There is good evidence that plurality-forming conjunction operates beyond the nominal part of speech, and that it can also form *event pluralities* (Bach 1986; Lasnik 1995; Link 1998), as illustrated below. Sentence (5a), adapted from Oehrle (1987), describes the frequency of two joint event-types, not of independent frequencies of occurrence.

- (5) a. Often, [[I go to the beach]_{e₁} and [you go to the city]_{e₂}]_{e₁+e₂}.

¹In the final version of this paper I will discuss case marking of adverbial nominals.

- b. Sue [[[got dressed]_{e₁} and [dried her hair]_{e₂}]_{e₁+e₂}, [in exactly twenty seconds]].
- c. You can't simultaneously [[drink]_{e₁} and [drive]_{e₂}]_{e₁+e₂}.

Levine (2003) raises further objections about the ‘adverbs as complements’ analysis, with the datum in (6), where the extracted phrase *In how many seconds flat* obtains a collective reading over the three events denoted by the entire embedded coordinate VP, not over each conjunct.

- (6) In how many seconds flat do you think that [Robin found a chair, sat down and took off her logging boots]?

This utterance is a query about the total time occupied by the occurrence of three (possibly overlapping) events. Such a reading suggests that the topicalized constituent is not a complement of anything in the sentence. If it were, then the adjunct should be predicating over each of the conjuncts separately, not the higher VP coordination node.

Levine (2003) – but see also Sato and Tam (2008) – propose that slash paths are terminated by traces, and therefore a modifier like the one in (7) can trivially be adjoined to a conjoined VP. When it does, it adds itself as an unbounded dependency, which is percolated and linked to a filler like any other unbounded dependency.

$$(7) \left[\begin{array}{l} \text{PHON } \langle \rangle \\ \text{SYNSEM } \left[\begin{array}{l} \text{LOC } \boxed{\text{I}} \left[\text{HEAD } \textit{adv} \right] \\ \text{SLASH } \{ \boxed{\text{I}} \} \end{array} \right] \end{array} \right]$$

There are two problems for this approach. First, the introduction of traces forces the grammar to become more complex in order to prevent overgeneration in coordination. In particular, the grammar will require extra constraints to capture the Conjunct Constraint, which falls out as a prediction of a traceless grammar (Bouma et al. 2001). See also Sag (2000) for a review of the standard arguments for the existence of traces, and their problems. A second issue is that nothing in Levine (2003) prevents the adverb trace in (7) from being adjoined to each of the VP conjuncts, instead of the coordinate mother VP. If it assumed – as standardly is assumed – that SLASH values are structure-shared between daughters and mother in symmetric coordination, then one would obtain an impossible interpretation where each conjunct event is the same. This is illustrated schematically in Figure 1. The problem that Levine (2003) falls prey is related to the one discussed in Levine and Hukari (2006, 159), where structure-sharing slashed event-modifying adjuncts originating in each conjunct yield a description that no sign can satisfy.

That is *not* to say that distributive interpretations of the adverb do not exist. These are a different matter entirely. For example, one can argue that an adverb like *yesterday* is distributive in the sense that when applying to a sum of events like $e_1 + e_2$ then it does not yield a collective predication (i.e. $yesterday(e_1 + e_2)$), but rather a distributive one (i.e. $\forall e \in e_1 + e_2 \rightarrow yesterday(e)$). Which adverbs are distributive, which are collective, and which are ambiguous is a matter of lexical specification, similar to how verbs like *smile*, *meet*, and *hire* can interpret their pluralic NP arguments in different ways. In my view this is what is happening in the ambiguous example from Levine and Hukari (2000,186), shown below. Although the PP attaches to the higher VP coordination, it can apply distributively to each event in the sum $e_1 + e_2$, or collectively.

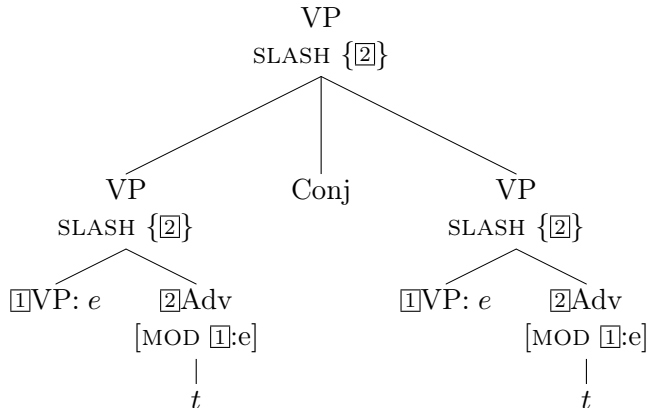


Figure 1: ATB adverbial extraction and impossible descriptions

- (8) Robin [stands on his head and falls off his chair] _{e_1+e_2} in order to attract people’s attention.

Sag (2005) proposes that the extracted phrase *in how many seconds flat* is a complement, but one that is allowed to semantically outscope the verb structure that it modifies. The idea is that in a coordinate structure, it should follow that the PP extracted ATB is required to simultaneously outscope each of the verbs heading the conjuncts, thus obtaining wide scope over the entire coordination. The main problem of this approach, in my view, is that there is no evidence that the modifier *in X seconds* is semantically scopal. Consider the examples in (9). The intersective modifiers in (9a) do not give rise to scope ambiguities, while the scopal modifiers in (9b) trigger an ambiguity with respect to the wide or narrow scope interpretation of the indefinite subject:

- (9) a. A spy photographed the documents yesterday / in twelve seconds.
 b. A spy probably / usually photographed the documents.

Below I propose construction-based account of (6) which has nothing special to say about coordination, applies to both intersective and scopal modifiers, does not rely on traces, does not have to assume the adjuncts-as-complements analysis, and does not require extra assumptions about rightward extraction.

2 A traceless constructional formulation

In this section I provide what is in effect a rule-based traceless version on Levine (2003). Although this rule is for English, the approach can also be adapted to other languages, by making it either a lexical rule or a rule that applies to sentences rather than VPs, depending on the language. Furthermore, the usage of a feature ADJ as in Levine and Hukari (2006) or Sato and Tam (2008) can ensure that in gap threading languages the verb can have access modifiers higher up in the tree structure, as their SLASH values.

Following the grammar fragment in Ginzburg and Sag (2000) in general terms, I propose a unary-branching phrasal rule that allows adjuncts to modify a VP as members of SLASH:

(10) ADJUNCT EXTRACTION RULE:

$$adj\text{-}extr\text{-}phr \Rightarrow \left[\begin{array}{l} \left[\begin{array}{l} \text{LOC } \boxed{1} \\ \text{SYNSEM } \left[\text{SLASH } \boxed{2} \cup \left\{ \text{XP} \left[\text{MOD } \boxed{3} \right] \right\} \right] \end{array} \right] \\ \text{DTRS } \left\langle \boxed{3} \left[\begin{array}{l} \text{SYNSEM } \left[\begin{array}{l} \text{LOC } \boxed{1} \\ \text{HEAD } \textit{verb} \\ \text{SPR } \langle \dots \rangle \\ \text{COMPS } \langle \rangle \end{array} \right] \\ \text{SLASH } \boxed{2} \end{array} \right] \right\rangle \end{array} \right]$$

The GENERALIZED HEAD FEATURE PRINCIPLE will percolate the head’s slash values in the tree structure. Moreover, since (10) is independent from coordination, it can also operate in non-coordinate cases. The account is illustrated in Figure 2. The VP daughter is modified by an adverbial phrase located in SLASH. Thus, *yesterday* modifies the event plurality that VP conjunction yields.

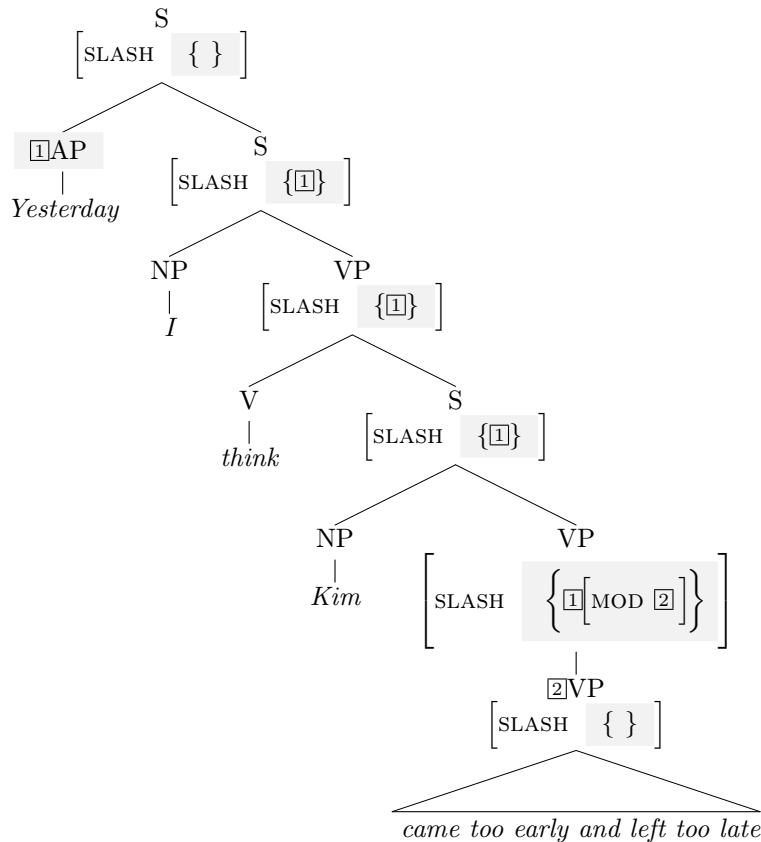


Figure 2: A modifier adjoining into SLASH

The next question to ask is what prevents ATB adjunct extraction as discussed in §1. In Copestake et al. (2006), existential quantification of events is often omitted for simplification purposes, but if one makes such quantification explicit – as in $\exists e \textit{left}(e, kim)$ – then the adjunct extraction rule cannot apply to each VP conjunct because the resulting seman-

tic structure is ill-formed, according to general MRS well-formedness conditions. Consider the parse in (11).

(11) [Under how many seconds flat] did Kim [pack _ and escape _]?

Each adjunct is located in the SLASH value of each VP conjunct, and predicates the respective event. The modifiers must be one and the same at the coordination level, because the coordination rule imposes identity of SYN values (as for example, in Beavers and Sag (2004)). Thus, the adverbial phrase filler has to predicate the very same event across conjuncts, and has to be simultaneously located under the scope of each existential quantifier. This yields an ill-formed MRS structure because the underspecified representation cannot describe a tree structure, as depicted in Figure 3. Arrows denote underspecified semantic subordination constraints. Here, \boxed{k} is the shared subject index of *Kim*, and $\boxed{e'} = \boxed{e1} = \boxed{e2}$. Both of these facts are consequences of the coordination rule.

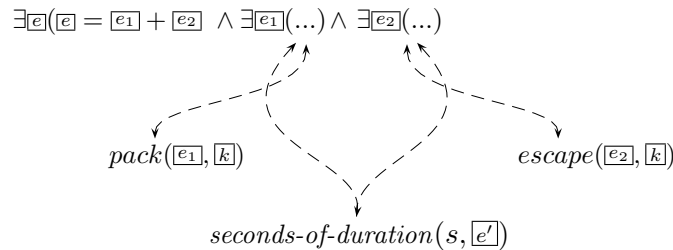


Figure 3: ATB adjunct extraction yielding an illegal MRS representation

3 Conclusion

This paper shows how a traceless construction-based account of modifier extraction in HPSG can be obtained for English, without some of the shortcomings of other accounts. There is no need to postulate traces, rightward extraction, or that non-scopal modifiers are scopal complements. The account boils down to a construction that can introduce adverbial unbounded dependencies in verbal structures.

4 Future work

There is another route for dealing with cumulative readings of extracted modifiers that has not been explored in the literature. I will argue that in this view, the phenomenon of cumulativity in adverbial extraction is but a special case of a more general mechanism that shows up elsewhere in the grammar, and that it has nothing to do with extraction or with modifiers. This traceless approach does not fall prey to the problems reviewed in this paper, and dispenses extra grammar rules such as the ADJUNCT EXTRACTION RULE as well as extra features like ADJS.

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