



Pre- and postverbal adverbials in OV and VO

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Received 5 March 2003; accepted 9 March 2003

Abstract

The paper focuses on the following questions: (i) Do adverbs originate in spec positions rather than in adjoined positions? (ii) How does the pre- vs. postverbal position of adverbs correlate with OV and VO? (iii) Why is the sentence-medial position highly restricted in VO languages? (iv) What is the adequate structural position for a postverbal adverbial? (v) Why is the order of postverbal adverbials a mirror image of the order of preverbal occurrences of these adverbials? The main body of empirical evidence is comparative evidence from German and English adverbial syntax. First, it is argued that for a wide range of data, an adverb-in-spec analysis does not provide descriptively or explanatorily adequate accounts. Second, the head-initial or head-final property of VPs and NPs in a given language is shown to be crucial for understanding the different patterns of adverbials in OV and VO. Adverbials that follow the head of the phrase they relate to are claimed to be embedded, adverbials that precede the head are claimed to be adjoined.

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Keywords: Adnominal attribute; Edge effect; Incrementality; Licensing domain; Opacity

1. Overview

The main questions and claims to be dealt with in this paper are:

- *Do adverbs originate in spec positions rather than in adjoined positions?* The answer will be: the syntactic behavior of adverbials is not adequately captured by assigning them to spec-positions. Adverbials do not behave as if they were spec inmates (see [section 2](#)).

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- *To what extent does the left/right position of adverbs with respect to V° correlate with head-initial and head-final word order characteristics, and how can this be accounted for?* It will be argued as follows: (i) in terms of structural licensing by the head of the projection, they are adjoined (entailments: restrictions for adjunctions to head *initial* projections; restrictions against adjoining to the *right*). (ii) In terms of semantic integration, preverbal adverbials are sister constituents of their linking domain (entailment: restrictions against higher adverbials in the domain of lower ones) and the inclusion relations of semantic linking domains determine the relative order of preverbal adverbs in syntax (see [section 3](#))
- *Why are sentential or phrasal adverbials excluded from sentence-medial positions in VO languages but not in OV languages?* The restrictions follow immediately from differences in the functional projection architecture in VO vs. OV clause structure, respectively, and the assumption that adverbials are adjoined rather than spec residents (see [section 3](#)).
- *What is the adequate structure for postverbal adverbials (embedded or adjoined or what else)?* The answer analyzed below is this: postverbal adverbials are embedded (see [section 3](#)) rather than right-adjoined.
- *Why is it that postverbal adverbials are in general ordered inversely with respect to the order of preverbal occurrences of these adverbials?* Conflicting evidence raises doubts against the obvious solution, namely layered adjunction to the left and to the right, respectively. The answer developed in [section 4](#) is this: semantic integration proceeds incrementally. In the result, the order preference is identical with bottom up adjunction, but the structure is not.

2. Adverbs in the spec position of adverbial heads?

In spec-F analyses, adverbials are taken to occur in the spec-position of adverbial functional projections. Analyses of this type have been argued for by [Alexiadou \(1994\)](#) and subsequently in an extensive approach by [Cinque \(1999\)](#). A Spec-F analysis is also implied by [Kayne's \(1994\)](#) antisymmetry proposal: a cascade of functional projections with silent F-heads on top of VP is assumed to host the adverbials in the respective spec positions. The order of adverbials in a clause thus reflects the nesting of functional projections. Since there must be a separate functional projection for each adverbial, whose semantics is identified with the semantic value of the silent functional head, each adverbial gives rise to a functional projection.

Counterarguments on empirical as well as theoretic grounds have been raised in [Haider \(1997b, 2000a,b\)](#). Empirical evidence that militates against a spec-F analysis comes at least from the following areas:

- lack of opacity for extraction
- edge effect
- interaction of VP topicalization and the head movement constraint

From an empirical point of view, the current analyses tend to narrowly focus on verbal contexts and to ignore the parallels between adverbials and adnominal attributes of the corresponding semantic types. A comparison of adverbials and attributes is a valuable source of evidence for deciding whether the relative order of adverbials is syntactically or semantically triggered. In the account defended in this paper, syntax provides potential positions. The interpretation (relative to position and semantic type) and the relative order of adverbials are semantically determined.

2.1. Opacity

The lack of opacity effects is a serious problem for spec analyses for the following reason: If grammar theory has produced insights into cross-linguistically valid invariants at all in the last two decades, the prime candidate is the opacity effect for constituents in spec positions. Extraction of subconstituents of phrases in spec positions produces robust unacceptability effects. The reason behind this is the ungrammaticality of extraction out of phrases in spec positions.¹ Postverbal adverbial PPs are not opaque in general, however.

- (1) a. Which house_i did you leave the car at e_i?
 b. the car e_i that he left his coat in e_i (Quirk et al., 1986: 664)
 c. the day which_i/that she was born on e_i (Quirk et al., 1986: 1254)
 d. * the day e_i she was born in England on e_i

The lack of opacity is counterevidence both for the spec-F analysis as well as for the adjunction analysis.² A constituent in a spec position is an extraction island (see 2b,c), and so is an adjoined position (2e). So, on the evidence of extraction data, the PPs in (1a–c) are neither adjoined nor in spec. Topicalization, as in (2d,e), yields an island, in either an adjunction or a movement to spec analysis of topicalization.

- (2) a. the constraint that it became difficult [to talk about e]
 b. *the constraint that [talking about e] became difficult
 c. *Which kind of constraints_i did [talking about e_i] become difficult?
 d. *Who_i did [to e_i] she give it?
 e. *the spot that/which_i he said [CP [on e_i] there will stand a huge tower]

¹ Whatever theoretical account is given for the opacity effect of phrases in spec will apply to adverbials in specs of adverbial functional heads as well. Take, for instance, Cinque's (1990: 42) barrier condition: "Every maximal projection that fails to be directly selected by a category non-distinct from [+V] is a barrier for overnemenent. Specs and the maximal projection in a Spec position as not directly selected, hence not governed, hence opaque.

² What these examples demonstrate is that time and place adverbials may be VP-internal, otherwise they could not be transparent for extraction.

The problem raised by the data in (1a–c) will not vanish if the spec analysis is restricted to preverbal adverbials. The same kind of data can be raised again, this time in an OV language like German, because English does not tolerate clause-medial phrasal adverbials (see below).

In German, phrases preceding clause-medial adverbials are not opaque, but they should be under the spec analysis of adverbials: If a phrase P precedes an adverbial in the spec of a functional head, P must be in the spec of a functional head, too, or it must be adjoined to a functional projection. In either case it is predicted to be opaque. The data however do not support this prediction.

- (3) a. Wen_i hat er [e_i damit zu konfrontieren] *leider noch nicht* versucht
 b. Wen_i hat er *leider noch nicht* [e_i damit zu konfrontieren] versucht
 who has he [with-it to confront] unfortunately not yet tried

Extraction in (3a) is as straightforward as in (3b). Of course, it is implausible to assume that negation and the adverbials would have moved. Either the clause has moved, or there are two positions to project an adverbial projection for the given elements in (3). In either case, the infinitival clause in (3a) precedes the adverbial projection, and it is not opaque. Note that the lack of opacity cannot be attributed to reconstruction.³

In sum: what the opacity data clearly show is mainly that in an OV-system like German, preverbal adverbials cannot be assigned to spec positions. For OV-systems, these data show at least first, that it is not possible to assign all adverbials to spec positions, and second, that postverbal adverbials are unlikely to be adjoined. The following OV–VO (more precisely: head-initial vs. head-final) contrast is straightforward evidence against a spec analysis.

2.2. Edge effect

The next set of data illustrates an ‘edge effect’ (see 4) that is typical for adjunction to head-initial projections (see also Haider, 2000b). For the evaluation of competing theoretical accounts it is important to keep in mind that the ‘edge effect’ is caused by (not yet fully understood) properties of head-initial structures, rather than OV/VO-specific parameterization.

- (4) a. He has [(*much more*) carefully (**than anyone else*)] analyzed it
 b. He has [(*much less*) often (**than I (thought)*)] rehearsed it
 c. Er hat es [*sehr viel* sorfältiger *als jeder andere*] analysiert (= a)
 d. Er hat es [*viel weniger oft als ich (dachte)*] geprobt (= b)
 e. als niemand *luider (dan Jan)* kan roepen [Dutch]
 ‘if noone louder than Jan can shout’
 f. omdat ik het *veel sneller (dan Jan (denkt))* in een zakje kan inpakken
 ‘since I it much faster (than Jan (thinks)) in a little-bag can pack up’

³ Reconstruction amounts to an acyclic rule application: First the wh-item is extracted, then the clause is moved in front of the adverbials. This would be ungrammatical because of a cycle violation.

Descriptively, the *edge effect* is the reflex of a constraint against post-head material in a phrase that serves as a preverbal adverbial constituent. Material on the left is allowed but not on the right-hand side of the head of the preverbal adverbial phrase. Note, first, that this effect must not be mistaken as a restriction that discriminates between ‘simple’ and ‘phrasal adverbials’, since the simple ones may be extended by premodifiers’.⁴ Second, this constraint is not an adjacency constraint for the head of the VP- and the adverbial phrase, as (5a,b) illustrates, and that it is not restricted to comparative constructions but to any not strictly head-final adjunct (5c,d). This is confirmed by the analogous constraint for adnominal attribute illustrated in (6).

- (5) a. Surely, he has [(more) *often* (*than anyone else)] *rudely* criticized her
 b. She had *less often* (*than I had expected) *nearly* failed an exam at the first time
 c. They *probably never* have seen a real politician
 (Baker, 1991: 309)
 d. *They [*with high probability*] [*at no occasion*] have seen a real politician

The edge effect of adverbials should be regarded as the counterpart of the *edge effect of prenominal attributes* in the N-projection. (6c) is the example corresponding to (4). Note that there is an edge effect for *adnominal attributes* in German but not for *preverbal adverbials*, since NPs are head *initial* but VPs are head *final* projections. Hence, the edge effect is not a language-specific phenomenon but a projection-specific one: It seems safe to conclude that it is a side effect of adjunction to head initial projections.

- (6) a. eine [viel größere (**als ich dachte*)] Summe
 ‘a much bigger (*than I thought) sum’
 b. ein [unzufriedener (**damit*)] Syntaktiker
 ‘an unsatisfied (*it-with) syntactician’
 c. ein [viel schöneres (**als ich dachte*)] (*neues*) Haus
 ‘a [much-more beautiful (*than I thought)] (new) house’

The theoretical relevance of the edge effect phenomenon is obvious: Edge effects are unknown for phrases in *spec-positions*, as e.g. phrases in Spec-C or Spec-I. So, an adjunction analysis of adverbials is compatible with an edge effect, but a spec-F analysis of adverbials is not.⁵ The point worth emphasizing is this: a spec analysis of adverbials does not capture the edge effect.

⁴ Bouchard’s (1995: 409) account in terms of ‘simple vs. phrasal’ is too restricted. He claims that preverbal adverbials in English or French are head-adjoined to the verbal head and therefore ‘simple’. This cannot be entirely correct since the adverbial may be phrasal, as the examples show, since they allow pre-head modification.

In sum: edge effects are incompatible with a spec-analysis. Specs are positions for complete phrases. If intermediate adverbial positions are spec positions, then there is no way for a constraint on the structure of the spec constituent to apply. The edge effect described above is clear counterevidence for a spec-analysis for the respective adverbials.⁶ Uncontroversial examples of spec-positions as spec-I or spec-C do not incur an edge constraint. The proponents of a spec analysis have been silent on the correlation between the edge effect and the headedness of a projection.⁷ Interestingly, opacity and edge effect are widely ignored in current proposals although at least opacity has been part of the standard repertoire of syntactic diagnostics for quite some time.

2.3. Interaction with VP-topicalization

In German, the topicalized constituent must not contain the trace of the finite verb. This kind of crossing violation leads to ungrammaticality and unacceptability of the example (7c). Consequently, functional projections, whose heads would be on the path of the fronted finite verb, cannot be topicalized.

- (7) a. Die Zeit sagte_j er noch nie an-e_j
 the time *nounced_j* he never ever *an_{-j}*⁸
 b. [Die Zeit angesagt]_i hat er noch nie e_i
 the time announced has he never ever
 c. *[Die Zeit an-e_j]_i sagte_j er noch nie e_i
 the time *an-e_j* *nounced_j* he never ever

V2 strands the particle of complex verbs with a so-called separable prefix (7a). This is mimicked in the gloss of (7a,c) by etymologically separating the verb *ad-mit*. The unacceptability of (7c) is evidence for a crossover violation: The trace of the fronted verb is not in the c-command domain of the verb in the V2-position, if the

⁵ Note that the ban against sentential and prepositional phrases as preverbal adverbials (that is adverbials between the position of the finite auxiliary and the left edge of the VP) is also an aspect of the edge effect because clauses and PPs are left-headed. So their complement blocks adjacency between the phrasal head and the point of attachment.

⁶ The edge effect can be easily tested with frequency adverbials. Since these adverbials belong to the core set of adverbials for which the spec analysis has been proposed, the problem is a genuine one for the spec analysis proponents.

⁷ Cinque (this issue: section 3.5) is the first one who offers an analysis. He suggests an account in terms of ‘intraposition’: Starting from “... than [more carefully anyone else] analysed it” (his example 20b), *than* attracts “anyone else” as its complement, and furthermore the ‘remnant phrase’ is to be moved to the spec position of *than*. In Cinques brief exposition the remnant is specified as “[more carefully t] analyzed it].” This is not evident, however. First, the smaller remnant is “[more carefully t]”, and if it is moved, the ungrammatical order (4a) is the result. If the ‘big’ remnant would end up in spec-*than*, it is predicted to be opaque, which is empirically contradicted by examples like: “Which problem did he [spec-*than*[more carefully analyze t] than anyone else].” Finally, it is unclear what kind of constituent “[more carefully anyone else]” could be.

⁸ The gloss mimics the split between a separable prefix and the verb in German: *an* + *sagen* (announce), lit. *on* + *say*.

VP that contains the trace is (part of) the topicalized constituent. (7b) is fine, since the fronted constituent is a non-finite VP, that is, a VP that depends on the finite auxiliary.

This state of affairs is crucial for the following data since it turns them into immediate counterevidence for a spec analysis of adverbs. If the fronted constituent is a VP and not a higher functional projection containing a VP, the adverbials in (8) must be VP-internal since there is no functional projection to host them. On the other hand, if the adverbials in the topicalized constituent are hosted by functional projections cascading on the top VP, this cascade must contain traces of the finite verb because the finite verb must move through all the higher functional head positions, or else it violates the head movement constraint.

- (8) a. [Gewöhnlich dann schon immer bestens präpariert] hatte sich nur einer
usually then already always best prepared hat himself only one
b. [Wohlweislich immer gut ausgerüstet] hatte man die Mannschaft
wisely always well equipped had one the crew
c. daß man ja dieses Jahr hier *schon öfter* wen ganz *schnell wieder fast ganz*
geheilt hat
that one indeed (in) this year here already often someone quite fast again
almost toally cured has

Note that the examples in (8) contain adverbials that Cinque (1999: 34 and 106) lists in the set of adverbials that reside in functional spec positions. The fact that these adverbials participate in VP topicalization (8a,b) and the fact that they are found interspersed with circumstantial adverbials (time, place, instrument, etc.) in (8c) forbids *first*, to draw a principled distinction between circumstantial adverbials and ‘functional’ adverbials, and *second*, to exclude circumstantial adverbials from a spec-F analysis for adverbials, if this analysis is foreseen.

2.4. Adverbials in comparison with attributes

Finally, the current spec-F analyses for adverbials are not broad enough in their coverage. It is a shortcoming that the approach is tailored to the structure of the verbal projection and its functional extensions, overlooking that there are other contexts (adverbials in APs, DPs) that need to be covered. This is not a principled defect, but it rules out proposals that tie the functional cascade of adverbials too closely to the functional architecture of the clause. Another shortcoming along the same line is the ignorance of the parallels with adnominal attributes. This includes the edge effect, the order preferences among attributes or adverbials and the syntax–semantic interface issue: In the spec-F analysis, the functional head of the adverbial projection is seen as the crucial factor. It links the phrase in spec and it is semantically integrated. The comparison with attribution is revealing in this respect:

- (9) a. die [*gestern* noch richtige] Theorie
the [*yesterday* still correct] theory

- b. Die Theorie stimmte *gestern* noch
the theory suited *yesterday* still
- c. die *gestrigen rechtzeitig* *mehrfachen gründlichen* Durchsuchungen
der Räume
the of-yesterday_{AGR} timely_{AGR} repeated_{AGR} thorough_{AGR} searches of
the rooms
- d. Die Räume wurden *gestern rechtzeitig mehrfach gründlich* durchsucht
the rooms were yesterday timely repeatedly thoroughly searched

Let us assume for the sake of demonstration that a time adverbial like *gestern* (= *yesterday*) is in the spec of a functional projection. Then this projection should be part of the structure of (9a) and of (9b). The silent functional head of this projection is semantically typed and plays a role on LF. The iteration of attributes in (9c) corresponds to the iteration of adverbs in a clause (see 9d). Each of these attributes in (9c) agrees with the head of the NP and the DP in number, gender, and case features. So, if there are functional projections involved, these are functional projections of number, gender, or case, but not of adverbial functions. Nevertheless, the order (see 9) and interpretation (see 10) is the same.⁹ The four sentences in (10) are paraphrasing each other. Note that in (10c,d) attributes and adverbials are mixed.

- (10) a. [Die *gestrige* Diskussion] dauerte länger als die *heutige*
[the yesterday_{AGR} discussion] lasted longer than the (of) today_{AGR}
- b. [Die Diskussion *gestern*] dauerte länger als die *heute*
[the discussion yesterday] lasted longer than the (one) today
- c. [Die Diskussion *gestern*] dauerte länger als die *heutige*
[the discussion yesterday] lasted longer than the (one) today_{AGR}
- d. [Die *gestrige* Diskussion] dauerte länger als die *heute*
[the yesterday_{AGR} discussion] lasted longer than the (one) today

The comparison of adverbials and attributes provides reason to assume that the relative order among multiple occurrences of adverbials or attributes is semantically conditioned rather than structurally. Syntax determines possible positions for adverbials, but semantics determines the relative order and the adequate position relative to the semantic type of the adverbial and its domain of integration. Predicates of a higher type necessarily precede predicates of a lower type because the domain of semantic integration for the higher type includes the domain for the lower type. For example, if one adverbial predicates over a property of the process denoted by the verb (manner adverbial), and another one predicates over the event denoted by the VP (e.g. time adverbial), the latter will precede the former, because it needs to be adjoined higher.¹⁰

⁹ The parallelism is noted also in Quirk et al. (1986: 457n):

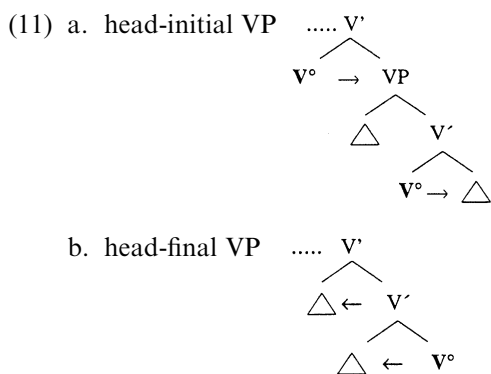
a. an apparent enemy—he is apparently an enemy. b. possible meeting—they will possibly meet. c. a slight disagreement—they disagree slightly. d. the current manager—she is currently the manager.

¹⁰ To be precise: This applies to preverbal positions only, because only in these position the adverbial are able to c-command their appropriate domains of integration. Postverbal positions are extraposed, as will be argued below.

3. Positioning and serialization of adverbials in VO and OV

3.1. Reflections of a basic difference in phrase structuring

VO and *OV* are but abbreviations for head-initial and head-final structures, respectively, and concomitant implications for phrase structure in general. The foremost and fundamental difference is this: A complex¹¹ head-initial projection, in contrast to a head-final one, consists of projection shells (Larson, 1988). In Haider (1992/2000), this property of head initial projections has been shown to be derivable as a theorem from the combination of three axioms, namely: (i) projections are endocentric, (ii) heads license their complements directionally, and (iii) projections are right-branching. The first two are widely accepted, the third one ('Branching Constraint')¹² is argued for at length in the aforementioned paper and in subsequent publications.



The arrows in (11) indicate the licensing directionality of the head. Evidently, in (11b), any VP-internal phrase is immediately dominated by the projection of the head c-commands the surface head position of the VP, and the phrases are all on the directionally licensed side of the head. In VO-projections, pre-head positions are not directionally licensed. This difference is crucial for understanding the 'edge effect'.

Moreover, if the finite verb remains in-situ in the VP, a preverbal adverbial c-commands the finite verb.¹³ This is not so for (11a). VP-internal, post-verbal phrases do not c-command the surface head position of the VP head, and they cannot c-command the position of the finite verb.

Immediate consequences are easy to derive: First, any adverbial that c-commands the finite verb (because it related to the event variable situated by the tense and mood features), is preverbal (12a vs. 12b) and VP-external in an OV-language like

¹¹ That is, a projection with more than one complement.

¹² Basic Branching Constraint (Bbc): "Projection-internal branching nodes of the (functionally or lexically extended) projection line *follow* their sister node."

¹³ There is good evidence that the clause final finite verb in German (and other OV languages) is not raised to a higher functional head position on the right but rather remains in situ (Haider, 1997a,b,c, 2002).

English (cf. Ernst, 2002: 46). Second, strictly VP-internal adverbials cannot precede the finite auxiliary in English (12c vs. 12d).

- (12) a. They could {*probably/surprisingly/similarly*} (not) find an adequate solution
 b. They could (not) find an adequate solution {**probably/*surprisingly/*similarly*}
 c. They have very often/*extremely carefully*/reanalyzed the data
 d. They /very often / **extremely carefully* have reanalyzed the data

Note that a right adjunction analysis would not rule out (12b), if these adverbials were right-adjoined to functional projections on the right, high enough to c-command the surface position of the finite verb or its trace. The ungrammaticality triggered by manner adverbials that precede the finite auxiliary in English reflects both, a domain condition and a movement restriction: A manner adverbial is a VP-internal adverbial.¹⁴ So, it cannot be linked with a functional projection. Hence, the position in (12d) is an illicit base position for a manner adverbial. And, the position is not a target for movement, obviously. This presupposes that adverbials do not scramble from VP-internal to VP-external positions.

3.2. No room for preverbal clause-internal phrasal adverbials in VO

The discussion of the ‘edge effect’ in section 2.2 highlighted the relevant background. Evidently, the syntactic characteristics of phrase internal adverbial positions correlate with headedness. The crucial factor is easy to identify, it is the directionality of licensing. In a head-final projection, any phrase internal position is in the canonical licensing domain of the head of the phrase, since the head of one of its projections immediately c-commands these positions.

In head-initial projections, however, positions preceding the head are not in the canonical licensing domain, since initial heads are initial because they license to the right (see the tree diagrams in the preceding subsection). This is the grammatical source of the *edge effect*,¹⁵ illustrated once more in (13) for English. (13c) illustrates that an edge effect is not found with topicalized adverbials. Given that topicalized items are moved to spec-positions, it is unlikely that the intermediate adverbial positions are spec positions, as argued already above.

- (13) a. He will easily/**without any difficulties* find an appropriate solution
 b. He very soon/**within one minute* found an adequate solution
 c. (*that*) *without any difficulties, within one minute*, he found an appropriate solution

¹⁴ Manner adverbials occur in postverbal VP-internal positions (He has talked *gently* to her), or in preverbal ones (He has *gently* talked to her).

¹⁵ It seems that the edge effect reflects a difference in the structural licensing of adjunction positions. If the position is not within the directional licensing domain of the head, a particular, not fully-understood restriction becomes operative: the head of the adjoined phrase must be adjacent to the node the phrase is adjoined to.

With respect to the edge effect, English is representative for VO languages, while German is representative for the OV situation. Since in German, the preverbal adverbials are within the directional licensing domain, the head structurally licenses the positions. No edge effect is found.

- (14) Sie hat ja *müheless/ohne jede Mühe sehr schnell/in einer Minute* eine Lösung gefunden
 she has well *easily/without any effort very quickly/in one minute* a solution found

As a consequence of the highly restricted availability of preverbal positions for adverbials in VO clauses, phrasal adverbials are bound to appear either in topicalized or in postverbal positions. A comparison with OV clauses reveals that the latter positions are extraposed ones, except for manner adverbials. Manner adverbials cannot be extraposed (see 15c) since they need to c-command the (trace of the) verb they relate to. In English, a postverbal manner adverbial as in (15e) cannot be extraposed (see 15f).

- (15) a. Er hat *gestern* höflich mit ihr gesprochen
 b. Er hat höflich mit ihr gesprochen *gestern*
 c. *Er hat gestern mit ihr gesprochen *höflich*
 d. He has *gently* talked to her yesterday
 e. He has talked *gently* to her yesterday
 f. *He has talked *yesterday* to her *gently*

With the insight that there is a principled grammatical reason that blocks clause internal phrasal adverbials in left-headed sentential projections, the next issue on the agenda is extraposition. Postverbal adverbials other than manner adverbials are extraposed, and the correct analysis of extraposition is the correct analysis for extraposed adverbials.

3.3. The structural positions of extraposed postverbal adverbials

The standard analysis for postverbal adverbials used to be right adjunction. Various adjunction analyses have been proposed in the literature that differ in the details of the adjunction sites. Kayne (1984) and May (1985) assume postverbal adverbials to be adjoined to the VP (16a). Ernst (1994) claims that adverbials are VP-internal, and that they are structurally superior to the arguments in a binary, left-branching V-projection (16b). The opposite option—an analysis of adverbs as structural complements—has been introduced by Larson (1988) and taken up among others by Stroik (1990): They assign postverbal adverbs to the most deeply embedded positions in a V-projection (16c) consisting of VP shells.

- (16) a. [_{Vmax} [_{Vmax} ...] Adv]
 b. [_{Vmax} [_{V'} [_{V'} V° DP] Adv] Adv]
 c. [_{Vmax} ... [_{V°} Adv]

In addition to the pure adjunction analyses there are proposals that presuppose more intricate measures. Pesetsky (1995) proposes a dual structure hypothesis with adjunction ('layered structure') on one structural representation and complementation ('cascading structure') on the other. Cinque (this issue) proposes a VP pied-piping analysis ("rolling up the VP") to the extent that apparent postverbal adverbials are taken to be in preverbal spec positions, but with VP material moved to positions preceding these adverbials.

What this wealth of proposals indicates at least is that the grammar of adverbials is still insufficiently understood and that an uncontroversial insight has not yet been achieved. A main obstacle seems to be the puzzling empirical situation: The *cumulative* evidence produced by constituency diagnostics for adverb positions seems to be inconsistent, even for a given single sentence. This led Pesetsky (1995) to the conclusion that the inconsistency is part of the system and not a sign of an imperfect grammatical analysis.

He notes that *VP-fronting* suggests a layered structure for a sentence like (17a), indicated in (17b), on the evidence of movement (17d): The fact that the fronted VP can strand adverbial PPs implies that the stranded PP c-commands the base position of the fronted VP. This is fulfilled if the PP is adjoined (17b). In this case, the VP does not contain the adverbials and the anaphor is not c-commanded by its antecedent. But, since the anaphor in (17a) is successfully bound, and since the c-command requirements for this anaphor binding require a hierarchical structure, a structure as indicated in (17c) must be assigned to (17a): In this case, the domain of the anaphor contains the adverbial PPs. Hence the contradiction.

- (17) a. He gives the book to them_i in the garden on each_i others birthday
 b. He [[gives the book to them_i] in the garden] on each_i others birthday]
 c. He [gives the book to them_i [in the garden [on each_i others birthday]]
 d. and [give the book to them_i] in the garden] he did on each_i others birthday

Evidently, the structures indicated in (17b) and (17c) are different and incompatible. As Phillips (2003: section 2) remarks, "the most widespread response to constituency conflicts is to question the assumptions about the tests which lead to the contradiction". For instance, the premise that c-command is at the basis of the binding patterns has been questioned.¹⁶ Another reaction is to weaken the constraints on phrase structure. Pesetsky (1995) gives up the premise that there is always a unique phrase structure representation for a given surface structure. The conflict would not arise if the conflicting evidence were assigned to different phrase structures for one and the same expression.

I am sympathetic with Phillips' (2003) position that there is no need for a grammarian's capitulation in face of the very existence of conflicting evidence, but need for additional efforts to be invested into a better understanding of the factors that produce these apparent conflicts. Some conflicts are easy to resolve, some are more

¹⁶ Barrs and Lasnik (1986), Jackendoff (1990), or Ernst (1994), to name some authors, propose precedence plus m-command instead of c-command.

recalcitrant. Let us start with easy ones. A conflict is easy to resolve if it rests on an assumption that can be identified as incorrect. The hard ones are those that require more far reaching measures and significant backtracking on the way to a more adequate theory of grammar.

It is well known for a variety of dependency relations that in the English VP, an element towards the left behaves as if it c-commands an element on its right, and not vice versa. Barss and Lasnik (1986) reviewed this property for double object constructions involving binding of reflexives, bound variable anaphora, negative polarity licensing, weak crossover, and superiority. These data form the empirical basis for Larson's (1988) VP-shell account of double object constructions. Jackendoff (1990) adds an extensive overview of other double complement constructions. Haider (1992/2000) and Kayne (1994) developed general theoretical frameworks—restrictions against projections with layering to the right—that covers and predicts Larson's approach as a special case. The grammar of adverbials, in particular of post-verbal adverbials in VO-languages, has not yet been explored in depth within these frameworks, and the challenge is evident: If postverbal adverbials are adjoined on the right hand side of a VP or a higher projection, theories that strictly forbid to target adjunction positions to the right could not be maintained any longer.

Let us recapitulate: VP-fronting in English seems to be handled best with adverbials *adjoined* to VP.¹⁷ C-command sensitive relations (reflexive binding, bound variable interpretation, negative polarity licensing),¹⁸ however, are handled best if adverbials are *embedded* in the VP and c-commanded by the objects. A comparative look into German tells that VP-fronting is the candidate in need of re-examination:

As pointed out in Haider (1990), the reconstruction of a topicalized VP may result in ungrammaticality. In other words, if the fronted VP is put back into its alleged extraction site, the resulting structure becomes ungrammatical if, for instance, extraposition has been applied (18b), or a VP-internal indefinite ends up in the scope of negation (18f).

- (18) a. [*Gerechnet damit*]_i hat_j sie nicht mehr e_i e_j
 reckoned with-it has she not anymore
 b. *daß sie nicht mehr [*gerechnet damit*] hat
 c. [*Gesagt, wie es funktioniert*] hat er dem Kollegen leider nicht
 told how it works has he to the colleague unfortunately not
 d. *daß er dem Kollegen leider nicht *gesagt wie es funktioniert* hat
 that he the colleague unfortunately not *told how it works* has
 e. [*Etwas dazu beigetragen*]_i hat er nicht e_i
 something to-it contributed has he not
 f. *daß er *nicht [etwas dazu beigetragen]* hat
 that he not something to-it contributed has

¹⁷ This was already conclusively discussed in the 1980s. See for instance Andrews (1982) and the literature cited there.

¹⁸ See Pesetsky (1995: 161f.) for extensive illustration.

What these data show is at least that a topicalized VP is not as direct a snapshot of VP structure as it is sometimes suggested. English data that demonstrate the same point as the German ones are less easy to testify but the following case may illustrate the point (see 19). As observed in Haider (1992/2000), extraposed relative clauses precede argument clauses (see 19a vs. 19c). This order relation is not conserved under VP topicalization, however, as (19b) illustrate, whose reconstructed order is the same as the order in (19c).

- (19) a. Everyone had told her who she met that the end was near
 b. ... and [told her that the end was near] everyone has who she met
 c. ??since everyone had told her that the end was near who she met, ...

We conclude that the ‘copy’ of the topicalized VP is not necessarily identical with the topicalized VP, otherwise (18a,c,e) and (19b) ought to be deviant. This is confirmed by the contrasts in (20), an observation of Freidin (1986) and Lebeaux (1988): a referential expression inside the complement of a fronted NP induces a principle C violation when a coindexed NP c-commands the extraction site (20a,c).

- (20) a. *The remarkable proof of Fermat_i’s conjecture he_i could not fit in the margin
 b. The remarkable conjecture in Fermat_i’s book he_i did not expect to raise much interest
 c. *Den vollständigen Beweis von Fermat_i Vermutung hatte man ihm_i nicht zugetraut
 the complete proof of Fermat’s conjecture has one him not credited
 d. Den Druckfehler in Fermat_i Beweis hatte man man ihm_i verheimlicht
 the typo in Fermat’s proof had one (from) him not concealed

Phillips (2003) suggests that the ‘copy’ of the fronted constituent that is created in the base position consist only of the lexical head and its complement.¹⁹ Accordingly, the adjuncts in (20b) and (20d) are not part of the copy, whence the immunity of adjunct contained elements against a principle C effect. This cannot be entirely correct, however, since complement clauses of topicalized VPs do not differ from adjunct clauses. None of them triggers a principle C-violation:

- (21) a. [Erklärt, *(wie man Max_i helfen wolle)]_j hat man ihm_i nicht e_j
 explained how they Max help wanted have they him not
 ‘They did not explain him how they wanted to help Max’

¹⁹ Phillips assumes that NPs are leftbranching and that adjuncts are right-adjoined to the NP. This is inconsequent. The N-projection is just like the V-projection a head-initial projection. The principles for the internal structure of a projection cannot be category specific. In Haider (1992, 1992, 2000) it is argued that the complex N-projection just like any other complex head-initial projection consist of a rightbranching shell structure (see the following section).

- b. [(So) geholfen, (wie Max_i das wollte)]_j hat man ihm_i nicht e_j
 so helped as Max it wanted have they him not
 ‘They did not help him the way Max wanted it’

Possible solutions of the reconstruction problem are suggested in Haider (1990) and Phillips (2003). Both are representational accounts. The first one locates the crucial point in the ambiguous status to the trace of a (remnant) V-projection, the latter one in the incremental masking of VP-topicalization as a constituency test.

The VP-topicalization data are ‘remnant VP’ data. A topicalized ‘remnant VP’ is a projection related to a trace position that serves as the starting point for the projection of the remaining unsaturated A-structure of the verbal head. Thus, the discrepancy between the structure of the fronted (remnant) VP and the well-formedness requirements at the reconstruction site is captured: since the reconstructed VP is not a true copy of the fronted VP, the results of application of the well-formedness constraints are not identical. Here is an illustration:²⁰

- (22) a. [Besuchen]_i würde sie einen Professor zu Hause *nicht* e_i
 visit would she a professor at home not
 b. [Zu Hause besuchen]_i würde sie einen Professor *nicht* e_i
 c. [Einen Professor zu Hause besuchen]_i würde sie *nicht* e_i
 d. [Einen Professor *an seinem Geburtstag* zu Hause besuchen]_i würde sie *nicht* e_i
 a professor on his birthday at home visit would she not

Let us take the topicalized V projections at face value, that is, as V’ projections. Under standard assumptions, their trace is an empty category of the same projection category V’. On the other hand, the trace is an atomic element, that is, a non-branching syntactic entity, with the unsaturated residue of the A-structure of the head.²¹ In this sense, it is non-distinct from a V° position with the same A-structure as the unsaturated residue of the antecedent of the trace. For instance, the unsaturated A-structure of the Vⁿ = V° in (22c,d) is that of an intransitive verb. Viewed from this angle, the apparently contradictory evidence boils down to the insight that traces are atomic while their antecedents are complex syntactic entities. Consequently, traces must be acknowledged as traces, not as silent copies of the displaced elements.

The English situation looks more complicated. Because of its VP shell structure (23a), topicalized V-projections must contain all postverbal arguments, since the projection of the residual A-structure would have to start in the reconstruction position (see 23b), that is the surface position of the element in the construction without the possibility of fronting these elements.

²⁰ Note that what I sketch here is a representational account in terms of string to structure mapping, not a derivational one.

²¹ I assume, following Chomsky (see: *Bare Phrase Structure*) that the unsaturated A-structure information is passed on from the head to the projection nodes.

- (23) a. [visit_i [a professor [e_i at home]]
 b. *Visited she has [e_i a professor at home]

If, however, the projection would start in the position of the trace of the topicalized element in (23b), the direct object would be in the wrong position. It would have to be licensed in a higher position than it is in. Consequently, only non-argumental elements can be integrated into the structure created ‘around’ the trace:

- (24) a. [V^{°/n} in the garden]
 b. [V^{°/n} [in the garden [e on each other’s birthday]]]
 c. [Spec-V^{max} [V^{°/n} [in the garden [e on each other’s birthday]]]

The adverbial PPs in (24b) are not A-structure dependent, so the V-projection that head the topicalization chain can be the antecedent of V^{°/n}. The only argument not projected in the topicalized V-projection is the subject argument, but its projection position is higher, namely in the spec position of the V-projection, as illustrated in (24c).

A different but also representational approach is suggested by Phillips (2003). He proposes an account in terms of his incrementality hypothesis of structure derivation: Syntactic structures are built incrementally from left to right, i.e. in the order in which the terminal elements are pronounced (see Phillips 2003; section 1). So, a constituency test may refer to only those strings that are constituents at the point in the incremental derivation when the test applies. Apparent contradictions between constituency tests can arise only when those tests apply at different stages in the derivation. The following example (25a) serves to illustrate how the apparent conflict between the assumption of a right branching VP and the evidence from VP-topicalization, notably the well-formedness of (25b,c) are reconciled under this approach.

- (25) a. He will [give_i books [e_i to them [e_i in the garden [e_i on each others birthday]]]]]
 b. and [give books to them] he did in the garden on each others birthday
 c. and [give books to them in the garden]] he did on each others birthday
 d. [_{IP} [_{VP} Give books to them] [_{IP} he [_{I'} did #
 e. [_{IP} [_{VP} Give books to them [_{IP} he [_{I'} did [_{VP} give books to them #
 f. Give books to them he did give books to them in the garden on each others birthday

In (25a), the minimal constituent that contains the main verb contains everything in the VP because the verb c-commands everything to its right in a right-branching VP, as indicated by the bracketing in (25a). The crucial phases of the derivation of (25b) are given in (25d–f): (25d) shows the structure at the point in the derivation when the fronted VP-material, the subject and the auxiliary has been built. Note that the fronted VP is a well-formed VP-constituent. (25e) is the result of copying the VP into its underlying position, in which theta-role assignment is possible. Finally, in

(25f) the stranded PPs are added to, that is structurally integrated into, the reconstructed VP. “*This creates a structure in which the anaphor in the second PP is appropriately c-commanded by its antecedent. It also has the effect of destroying the constituency of the copied VP, but this is unproblematic, because the chain was created by constituent copying at the point at which it was created.*” (Phillips, 2003; section 4.2). The resulting structure is that of (25a). This example is representative of apparent constituency conflicts that arise when partial VP-fronting is used as a constituency test.

3.4. Scope data

Scope data (see Ernst, 1994, 2002; Pesetsky, 1995; Stroik, 1996) have been adduced as motivation for a VP-structure with adjunction to the right. The evidence is not as clear as one would like it to be, however. Let us examine an example discussed by Pesetsky (1995: 233).

- (26) a. He plays quartets in foreign countries on weekends
b. He plays quartets on weekends in foreign countries

He states, “if there is any difference in the scope of modification, the PP to the right has wider scope.” This would accord with ‘rightward is upward’, but there is another interpretation available as well. Phillips (2003; section 4.5) notes that arguments based on sentences like (26) fail to control for an essential intervening factor, namely focus. He claims, “once this effect is controlled for, which can be done by adding a third adverbial, we find that the strong right-to-left scope preference seen among the first two adverbials [in (26)] no longer obtains.”

- (27) a. Sue kissed him willingly many times (in front of the boss)
b. He plays quartets in foreign countries on weekends (at the height of the season)

According to Phillips, the reading in (27a) with left to right scope is much easier to obtain if there is a third adverbial that follows and bears the stress than without it, although right-to-left scope is still available. And in (27b) there is no longer a strong preference to interpret the playing of quartets in foreign countries as restricted to weekends.

If focus were indeed the crucial intervening factor, scope data would be no longer in conflict with the dependency data above.²² However, Ernst (2002: 183f.) emphasizes that the focus cases are only a subset of right-to-left scope cases.

According to Ernst, sentences (28a) and (28b) are ambiguous. In one reading the clause final adverbials get wide over the preceding ones, even without focal stress or intonation break.

²² What is still left unaccounted for is the order preference. Postverbal adverbials are preferentially ordered time before location, whereas preverbal adverbials tend to come in the inverse order.

- (28) a. They almost got hit again
 b. The patrol intentionally returned on Tuesday

Accurate though this observation may be, it is not fully representative since in the following examples, scope follows linear order. In (29a), the repetitive *again* has wide scope over the frequency adverbial *every Sunday*, and in (29b), *willingly* out-scopes *many times*. In (29c), the patrol's intention is described as *being back before midnight*, that is, with the temporal adverbial in the scope of the adverb that is sandwiched between the auxiliary and the main verb.

- (29) a. This year, he will sit *again* in the first row *every sunday*
 b. Sue kissed him *willingly many times* in front of their boss
 c. The patrol will intentionally return before
 midnight

In sum, these data seem to indicate that for *postverbal* adverbials, scope and order relations do not support a strict c-command based account.²³ Consequently, this area of grammar is not the primary area of decisive and immediate evidence for or against an adjunction versus an embedding analysis of postverbal adverbial positions.

3.5. *Postverbal* = *preverbal* + *pied piping*?

The preceding discussion presupposes that there is no standard way of reconciling the binding data with the VP topicalization data. Cinque (this issue: section 4) challenges this bias and suggests a derivational analysis that is to overcome the apparently incompatible structure requirements for postverbal adverbials. The solution is strictly preverbal generation plus VP pied-piping. In his implementation, Cinque adopts an idea of Kayne's with prepositions as attractors of their complements.

A sketch of a derivation is given in (30). It starts from the base order (30a), in which the adverbials start out as DPs, before they are attracted by their respective prepositional functors.

- (30) a. on - in - to - about - - Tuesday - *each other's* house - Mary -
these people - - speak
 b. [on Tuesday] [in each others's house] [to Mary] [about these people] speak]]]]
 c. [on Tuesday] [in each others's house] [speak to Mary] [about these people]]]]
 d. [[[speak to Mary] [about these people] [in each others house] [on Tuesday]]

In (30b), the adverbial DPs are already in their attracted position. In (30c), the VP, that contains only the verb, has been fronted. The resulting constituent is then pied piped, first right in front of the local adverbial and then, together with this adverbial, into its final position in front of the temporal adverbial (30d).

²³ This need not come as a surprise since VP internal arguments may get wide scope, too, as the widely discussed ambiguity of "everyone loves someone" demonstrates.

Let us briefly evaluate the advantages and disadvantages of this analysis. Its prime advantage is a constrained account of admissible adverbial positions (preverbal only) at the cost of additional, untriggered VP movements. Its disadvantage is that it does not provide a principled solution for the major empirical dilemma, namely the conflict of binding and movement data.

In the pied-piping account, the binding data remain problematic since the surface structure does not provide the necessary c-command relations, neither before nor after VP pied piping: The fronted VP must be placed in a spec-position of the would-be pied piped constituent. So, a VP-*internal* constituent cannot c-command elements in the pied-pied constituent. Given that preverbal adverbials are inverted by stepwise pied piping with a fronted VP, the postverbal order mirrors the preverbal c-command relations. If an adverbial X precedes an adverbial Y in the postverbal positions, X must be c-commanded by Y in the preverbal order. Therefore, a binding relation with a binder in X and a bindee in Y is unexpected. Note that reconstruction would not solve the problem. The predicted outcome would be binding relations that reflect the preverbal c-command relations, that is, the binder would follow the bindee in the surface representation because pied-piping inverts the order.

- (31) a. She talked to them at each other's party
 b. at- to- each other's party- them- talk
 c. at each other's party to them talk
 d. [talk to them] [F [at each other's party]]
 e. *Each other's party seemed to them to be the greater success

(31c–d) illustrates that at no stage of the derivation, the anaphor is c-commanded by its binder. Only the PP 'to them' in (31c) c-commands the trace of the DP attracted by the preposition 'at'. But this cannot be sufficient for binding, otherwise (31e) would be predicted to be correctly bound since the trace of the case-attracted DP subject is c-commanded by the PP that contains the potential binder.

In addition, reducing postverbal adverbials to preverbal ones misses an essential generalization, namely, that the edge effect is limited to preverbal positions. In the pied piping account, the edge effect is predicted both for preverbal and postverbal adverbials, since postverbal adverbials are preverbal ones that got stranded by fronting their right-hand neighbors.

Finally, the pied piping account predicts that VP-topicalization may freeze the preverbal order for the adverbials left behind: Take for instance a clause with three postverbal adverbials. If the fronted VP pied pipes only the lowest of the three, the remaining two should be serialized in the preverbal order, simply because the VP did not invert the order by an additional pied piping step. Consequently, VP topicalization applied to (30) is predicted to result in (32a) and not in (32b), that is, the order that should be derived.

- (32) a. [speak to Mary about these people] he did [on Tuesday] [in each other's house]

- b. [speak to Mary about these people] he did [in each other's house]
[on Tuesday]

In sum, the pied piping analysis does not seem to open the most straightforward avenue for successfully modeling the intricate grammatical properties of pre- and postverbal adverbial positions.

4. Order and compositionality

The order of arguments, namely *subject < indirect object < direct object*, is identical for OV as well as VO languages (Haider, 1992/2000). Why is the adverbial order mirrored? The answer will be: (i) postverbal adverbials are 'extraposed', arguments are not; (ii) the 'extraposition zone' is a non-compositional subconstituent of the V-projection, so its order relations are not determined by the head; (iii) the order relations for adverbials in the extraposition zone are interface effects, that is, semantically driven.

4.1. The extraposition domain is non-compositional

The answer I propose is based on two assumptions: First, adverbials in their postverbal positions in the *extraposition* domain are identified as base generated, VP-internal elements. Second, the extraposition domain is not *structurally* compositional. Semantical integration for non-arguments in this subdomain is a function of *linear incrementality*. Odd though this paragraph may read, there is evidence for these claims.

In Haider (1994, 1995, 1997c), it is argued that the order contrast in (33a,b) holds for VO and OV languages. The contrast seemed to have escaped prior notice. This is curious since in a widely accepted analysis of Reinhart (1983), (33a) but not (33b), was predicted to be ungrammatical because relative clauses were claimed to be adjoined higher than complement clauses. So, the relative clause in (33) ought to be clause-final, and not the argument clause. One reason for Reinhart's assumption was that principle-C effects affect argument clauses but not extraposed relative clauses. What has been overlooked is that the very same effect occurs also when both types of clauses are present simultaneously (see 33c). The order in (33c) is evidently incompatible with the assumption that a relative clause is adjoined higher than an argument clause. For the present purpose it is sufficient if it is granted that the complement clause, and therefore also the preceding relative clause, is in the c-command domain of the object.²⁴

²⁴ Arguments against the idea that the object clause is adjoined and that principle C is applied in the base position of the clause are put forth in Haider (1994, 1995, 1997c). Reconstruction is not a viable move since in the clear cases reconstruction does not feed principle C (cf. Riemsdijk and Williams, 1981 on anti-crossover effects):

- (i) I told him_i more than once that John_i should be more careful.
- (ii) That John_i should be more careful I had told him_i more than once.

- (33) a. It struck a grammarian last month [who analyzed it] [that this clause is grammatical]
 b. *It struck a grammarian last month [that this clause is grammatical] [who analyzed it]
 c. Someone had told him_i [who John_i had not met before] [that John*_i was in danger]

Let us analyze now the structure of clauses like those in (33) with respect to bottom-up compositionality. The structure of (33c) is indicated in (34). The relative clause is sandwiched in between two argument expressions. The minimal syntactic constituent that contains both the relative clause and the complement clause does not correspond to an entity of a semantic representation that integrates both clauses. The semantic integration of the relative clause requires access to its nominal antecedent.²⁵

- (34) Someone had [_{VP} told_j [him_i [e_j [who John_i] [e_j [that John*_i was in danger]]]]]

A related case of constituent discontinuity in English is discussed in Haider (1997b). In a clause with both a subject related depictive predicate and an object related one, the former follows the latter (35a,b). Bound variable anaphora (35c) and negative polarity licensing (35d) confirms that the predicate is indeed in the c-command domain of the object, hence VP-internal (see Kayne, 1994: 71 on example 35c,d).

- (35) a. He ate the fish raw drunk c. He ate the fish raw himself
 b. *He ate the fish drunk raw d. *He ate the fish himself raw
 c. He left every_i party [angry at the person who had organized it_i]
 d. He left none_i of the parties [any_i more unhappy than he usually is]

Again, there is no immediate compositionality: the minimal constituent that contains the two predicates consists of the two predicates plus the empty verbal head. This constituent does not correspond to an independent semantic substructure of the clause. In a bottom-up perspective, the semantic integration of the predicates cannot be accomplished without the arguments the predicates are related to. So, the italicized part in (36) cannot be immediately integrated semantically.

- (36) He [_{VP} ate_i [the fish [e_i [*raw* [_{VP} e_i *drunk*]]]]]

With this in mind, the idea that a well-formed syntactic projection should be mapped node by node in a bottom-up procedure onto an immediately interpretable semantic representation becomes less forceful. Phillips (2003) emphasizes the need to

²⁵ It is the position of the antecedent that matters for the computation of principle C-effects. The c-command domain of the object pronoun contains the detached relative clause but not its antecedent.

pay attention both to the static aspect of phrase structure and the dynamic aspect of processing it. Syntactic structures are processed *incrementally*, that is, in a process that follows the order of the phonetic presentation of the terminals. This process corresponds to a left-to-right procedure if illustrated with a written example in our writing conventions.

The next piece of evidence is the edge effect discussed above. It is sufficient to realize that for adverbials in VO-languages, the preverbal position, that is, the structural position that directly matches their semantic scope domains, are not fully available for independent reasons. As a consequence of this restriction, these adverbials occur in extraposed positions, or they are topicalized. This is important to keep in mind: In VO-languages, some positions are not open for phrasal adverbials. So, not every scope domain can be matched with a structural domain of the overt syntactic structure.

Now, we can proceed to answer the open question: what is the grammatical causality of the structure of postverbal adverbials in VO-languages, with the two main consequences: (a) inverse order with respect to the order of preverbal adverbials in OV-languages; (b) left-to-right c-command relations. The appropriate structure is apparently a combination of the by now familiar VP-shell structure with a left-branching projection (cf. Larson, 1988; Haider, 1992/2000; Stroik, 1995), and an extraposition part, as illustrated in (37).

(37) The plane [_{VP} arrived_i [uneventfully [e_i [at Tromsø [e [by midnight]]]]]]]

The first premise is that right adjunction is ruled out for principled reasons (Bbc). The second premise is that the admissible clause internal positions for adverbials are highly restricted (see the discussion of the edge effect). Hence, phrasal adverbials are ruled out in positions in between the functional subject position and the VP. These are the positions for event-related adverbials in OV-languages, however. Finally, let us keep in mind the parallel between VO languages and VO languages: The extraposed adverbials as well as the preverbal ones in OV-languages occur within the domain of the verbal head.²⁶

4.2. Towards incremental compositionality

The inverse order is a function of the incrementality driven compositionality modulo headedness. In an OV-language, *structural* compositionality and *incremental* compositionality coincide: The immediate constituent of a head final projection that

²⁶ Another implication is this: order patterns in the extraposition zone are identical in OV and VO. Let us start with the trivial case. If an averb that cannot be extraposed in OV, this averb in a VO structure cannot follow an extraposed postverbal averb:

- a. He shocked me *profoundly* with his stupid remarks
- b. *He shocked me with his stupid remarks *profoundly*
- c. *Er hat mich schockiert *zutiefst* (mit seinen dummen Bemerkungen)

comes *first* is *higher* in the structure than the constituent that follows. So the relative order reflects the relative c-command relations. In other words, strictly head finals structures are bottom-up compositional. In a head-first VP, however, postverbal adverbials (except manner) are extraposed, that is, they are in a subtree of the VP that is not structurally compositional. Nevertheless, the VP remains *incrementally compositional* if the *serialization* of the items in the structurally non-compositional subtree mirrors the structurally compositional pre-head order. This is a function of monotonic incrementality: The semantically lower type domain is addressed before the higher one. So, in the extraposition domain, the adverb that needs to be integrated into the lower domain precede the adverbs that are integrated into higher type domains. Let me illustrate this with the pre- and postverbal ordering of temporal relative to locative adverbials.

In (38a), the extraposition domain as a semantically non-compositional subtree is enclosed in a box. The boxed constituents in (38a,b) are subtrees in the ‘extraposition area’. In an OV-language like German, this area is clearly delimited by the overt verb-position. In a VO-language, it can be identified only indirectly as that area in which non-extraposable elements are ungrammatical.

- (38) a. She [_{VP} handed_i [him [_{VP} e_i down] [something [e_i [in the hall[e before mn.]]]]]]]
 b. Sie reichte_i ihm etwas hinunter e_i [in der Halle[e vor Mitternacht]]
 she handed him_{Dat} something_{Acc} down in the hall before midnight
 c. Sie reichte_i ihm *vor Mitternacht in der Halle* etwas hinunter e_i
 she handed him_{Dat} before midnight in the hall something_{Acc} down

An *argument* must be in a strictly local relation²⁷ to the head verb (or its chain). In (38a), both the direct object and the indirect object are in spec positions of VP shells headed by a link of the chain of the main verb. The VP shell structure is enforced as a grammatically licit way of compromising two conflicting demands in a strictly right-branching phrase structure for projections: *endocentricity* of projections and directional *licensing* to the right (see section 3.1).

The crucial feature for the extraposition subtree is the licensing property of the empty head, which differs in a crucial respect from the licensing property of a lexical head. A lexical head is a licenser and an identifier. It licenses a position and identifies it. The empty head in the extraposition subtree is just a structural licenser. In other words, it guarantees endocentricity plus binary branching, but it is itself in need of licensing and identification by a governing lexical head, namely the main verb.

With this in mind, let us return to the order-by-incrementality issue: The relevant difference between OV and VO projections in this respect is the trivial fact that in a VO clause, at the point when the *postverbal* adverbials need to be semantically integrated (= identified), the VP proper is already *complete* in terms of the projection of its A-structure. In the case of preverbal adverbials in an OV projection, however, the

²⁷ In a spec-head-complement structure, for an element to be *strictly local* in relation to the head means: the element is either in the spec or in the complement position.

adverbials are integrated in an incrementally *incomplete* VP. The VP is incomplete for the trivial fact that at the point when the *preverbal* adverbials need to be identified, the incremental generation of structure has not yet included the verb. So, the integration of the preverbal adverbials respects the c-command structure of the VP-proper, that is, superdomain before subdomain. In the case of the extraposed adverbials, however, the order is subdomain before superdomain, for the same reason, namely incremental integration:

Let us take as a brute fact that the temporal situating of events applies to locally situated ones.²⁸ Why should the temporal adverbial *follow* in the post-verbal order and *precede* in the preverbal order? The answer is: for exactly the same reason. The VP plus the extraposed local adverbial are mapped on a locally situated event,²⁹ which in turn gets temporally situated by the next adverbial. In the preverbal positions, adverbials are adjoined to their respective semantic targets. So, in their surface positions they can be mapped directly on the corresponding type domains (compare 38c and 39a). If they are extraposed, the semantic construction algorithm can apply in the order they are serialized, resulting in (39b), which is of course structurally identical with (39a), modulo commutatively of conjunction.

- (39) a. [_E BEFORE (e, midnight) & [_E IN (e, opera) & [_E E (e) & AG (she) & TH (something) & G (him)]]]
 b. [_E[_E[_E E (e) & AG (she) & TH (something) & G (him)] & IN (e, opera)] & BEFORE (e, midnight)]

One might object at this point of the discussion that the present proposal introduces *linearity* as an independent factor, independent of the structural configurations. This is so, indeed, but only for an area in which structure does not determine linearity, namely in the extraposition area. If syntax does not dictate a unique linearization, the linearization options admitted by the structure system nevertheless are ordered, but the ordering factors may come from other modules of the systems, for instance from interface effects.

4.3. Independent evidence—adnominal attributes

The order of attributive modifiers is syntactically free, but this freedom is, as is widely acknowledged, semantically constrained. As illustrated in (40a), the preferred order for prenominal modifiers is, for instance, stage-level before individual level predicates. In the German appositive construction (40b) with post-nominal non-agreeing modifiers, the order is the mirror image of the preverbal order.

²⁸ This asymmetry seems to be cognitively grounded. Obviously, our cognitive system prefers to take localities as primary sorting keys for events that are then sorted temporally. Apparently, our Euclidean mind treats locations as more closely related with events than their temporal coordinates.

- (40) a. [zahlreiche schwarze Perlen mit seidigem Glanz] besaß er auch
 numerous_{Ag} black_{Ag} pearls with silky gloss owned he also
 b. [Perlen, schwarz, zahlreich, mit seidigem Glanz] besaß er auch
 pearls, black, numerous with silky gloss owned he also

Cinque (1994; see the literature cited there) discusses the following typological difference for adnominal modifier constructions, illustrated in (41): In Romance languages (41a,b), with pre- and postnominal positions for adjectival modifiers, agreement applies in both positions, and the prenominal and postnominal order is the same. In languages with rigid postnominal attributes (e.g. Indonesian, Thai), the order is mirrored (cf. 41c). In Cinque's account, Romance postnominal attributes are derived by moving N° across the prenominal modifiers. Rigid postnominal modifiers are base generated in the postnominal position.

- (41) a. una bella grande palla rossa
 a beautiful big ball red (order relation: *evaluation* < *size* < *colour* < N°)
 b. una palla_i bella grande rossa e_i
 c. bola merah tjantik [Indonesian]
 ball big beautiful
 d. ma daam may [Thai]
 dog black big

The parallels to the order relations within V-projections are obvious. First, the *postverbal* adverbials are base generated VP-modifiers. Being unselected, they are semantically integrated in a linearly incremental fashion. Correspondingly, the postnominal modifiers in (33c,d) are base generated, whereas the postnominal modifiers in Romance are *pre-nominal* ones that end up in apparent post-nominal positions as a consequence of head-movement. Hence their order remains unaffected. Second, in languages that allow both pre- and postnominal attributes, the prenominal ones show an edge effect. Therefore, complex head-initial attributes are postnominal only. Finally, the Italian pattern would be surprising if for the verbal system pied piping was needed in order to invert the preverbal order, whereas for the nominal system head movement would preserve the prenominal order.

5. Postverbal adverbials in OV and VO

In OV post-verbal adverbials are easily identifiable as extraposed because of the projection-final V position. In VO, 'postverbal' is less precise a characterization. It covers two independent sources of postverbal positions, namely (i) positions within the VP proper in the domain of the VP-shells, and (ii) the extraposed positions. The following issues are relevant in this context:

- In VO, adverbials may be postverbal without being extraposed (namely *manner*).
- Extraposition is VP-internal. So, ‘higher adverbials’ are excluded.
- For postverbal adverbials, the mirrored preverbal order is *preferential*

That there are genuine, non-extraposable adverbs in English is easy to demonstrate with manner adverbials. First, *post-verbal* manner adverbs precede prepositional objects and extraposed material (42a). Second, they are obligatorily fronted with VP-topicalization (42b), and third, cross-linguistic evidence from German (42c) confirms that manner adverbs do not extrapose.

- (42) a. He talked *gently* to everyone
 b. *... and talk he will *gently* to everyone
 c. ... and [talked gently to everyone] he has
 d. Er hat protestiert, dagegen/*lautstark

Higher adverbials, that is, adverbials that need to c-command at least the (base position of the) finite verb, cannot be postverbal. Postverbal means VP-internal, because the extraposition zone is a sub-constituent of the V-projection. This is confirmed by the well-known resistance of sentence adverbials against postverbal positions (cf. 43b). In an OV-language like German, the finite verb or its trace is in the c-command domain of a VP-internal adverb (43c) because of obligatory verb clustering (see chapter 7), unless the VP is topicalized (43d).

- (43) a. He *allegedly/deplorably/fortunately* will not be there when the meeting starts
 b. *He will_i not e_i be there *allegedly/deplorably/fortunately* when the meeting starts
 c. Er wird_i *angeblich/leider/glücklicherweise* nicht da sein e_i, wenn die Tagung begann
 d. *[*Angeblich/leider/glücklicherweise* da sein, wenn die Tagung beginnt] wird er nicht

This is a crucial implication of the asymmetry-based account, but it does neither follow from a movement nor from a base-generation adjunction account. In both analyses, a higher adverb could end up adjoined to the right as high as necessary for c-commanding the finite verb. It does not follow from an LCA-account (Kayne, 1994, 1998) either. In this account, a higher adverb could start out in a preverbal position and end up in a clause final position whenever the VP is fronted across the preverbal adjunct.

Let us now finally return to the issue of the mirrored relative order. Note *first* that in this case, we are dealing with a subset of adverbials that is defined by two related properties. These adverbials are *extraposable* ones and therefore they are *VP-internal*. Typical representatives are adverbials that code for time, place and instrument relations. *Second*, the order patterns are preferences and violable (see 44). The

examples (44a) and (44b) demonstrate the parallel between German and English, as representative of VO and OV, respectively. The preverbal order is shown in (44a). (44d,e) reconfirm that the order of the extraposed items is the inverse of the preverbal order. (44f) is an example with VP topicalization.

- (44) a. Er hat ja gesprochen *darüber in seiner Vorlesung im letzten Semester*, als ...
 b. He has talked *about that in his lecture in the last term*, when ...
 c. Er hat ja *im letzten Semester in seiner Vorlesung darüber* gesprochen, als ...
 d. Er hat *letztes Jahr in Wien mit einer Büroklammer* ein Schloßⁱ geknackt, dasⁱ ...
 e. Er hat ein Schloßⁱ geknackt, *mit einer Büroklammer in Wien letztes Jahr*, dasⁱ ...
 f. [Gesprochen *darüber in seiner Vorlesung im letzten Semester*]
 hat er viel/kaum

The mirror order is a function of incremental integration of postverbal adverbials. The adverbials are integrated into the semantic representation of the VP in a pushdown storage manner: What is integrated first ends up integrated lower than the following item in the final semantic representation. In this way, the stack-like serialization of the extraposed adverbials mirrors the order of the semantic integration. The fact that the order is preferential and not mandatory confirms that the source is ease of processing (parser friendliness) rather than grammar principles. The grammar provides positions but does not require semantic pre-booking.

6. Summary

1. The structural properties of adverbial phrases are not satisfactorily modelled if assigned to spec-positions of functional heads. The traditional account in terms of adjunction is not fully adequate either since it applies only to preverbal adverbials. Postverbal ones are embedded.
2. Licit adjunction sites for adverbials are determined by sentence structure. Mapping constraints of the syntax–semantic interface determine the compatibility of a given structural site with a possible interpretation.
3. Adverbials are adjoined or embedded, depending on the relation to the head of the containing phrase: they are adjoined if they precede the head of the containing phrase. They are embedded if they follow the head of the containing phrase.
4. The adjunction and embedding options follow from a general projection restriction: projections are right branching. So, adjunction is possible only to the left, but not to the right. Consequently, post-head adverbials are embedded.
5. The relative order of adverbials is an epiphenomenon of interface conditions. The order patterns of adverbials in the extraposition domain is a function of linear incrementality of semantic integration in a non-compositional subdomain.

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