

Eliminating rightward movement:

Extrapolation as flexible linearization of adjuncts

Abstract: We propose an account of adjunct extrapolation that does not invoke rightward movement. Instead, the non-canonical placement of adjuncts at the right edge of a sentence arises from the very same mechanisms that allow adjuncts to behave flexibly with respect to basic constituency tests and to avoid reconstruction. The system we propose naturally explains the locality restrictions on extrapolation and certain interactions between extrapolation and movement, and dovetails with an analysis of how adjuncts semantically compose with their hosts.

Keywords: extrapolation, rightward-movement, adjunction, event semantics

The locality constraints on rightward movement have long been known to differ from those on leftward movement. Rightward movement therefore seems to be different in kind from the more canonical leftward movement, raising significant theoretical issues: why should there be *two kinds* of movement, and why should the two kinds correlate so precisely with the *linear direction* of the displacement? We propose that these puzzles can be resolved in the case of extrapolation constructions like those in (1), by assuming that these examples do not in fact involve any sort of rightward movement. Unlike earlier suggestions involving base-generation (e.g. Culicover and Rochemont 1990), our analysis of the non-canonical placement of the bracketed adjuncts in (1) unifies this phenomenon with other well-known properties of adjuncts: we propose that the very same mechanisms which permit adjuncts the flexibility to act “inside or outside” the fronted VP in (2), and to escape reconstruction effects in the contrast in (3), gives rise to the possibility of the non-canonical adjunct placement in (1).¹

- (1) a. A book ___ appeared [about the price of tea in China]
b. I called somebody ___ yesterday [who I couldn't stand]

- (2) a. Read books quietly (is what) John did
- b. Read books (is what) John did quietly
- (3) a. * Which argument [that John_i is a genius] did he_i believe?
- b. Which argument [that John_i made] did he_i believe?

We build on an account of the facts in (2) and (3) from Hunter (2010), where it is proposed that these syntactic properties of adjuncts derive from a hypothesis about the semantic composition of adjuncts and how it differs from that of non-adjuncts. Though it was not proposed as an account of extraposition, a minimal extension of the system provides a straightforward account of this phenomenon that directly explains its core properties (see Baltin (2005) for a review).

The rest of the paper is organized as follows. In section 1 we review some descriptive generalizations concerning the locality constraints on basic instances of extraposition and previous accounts of these facts. In section 2 we introduce our analysis of adjunction which unifies the basic constituency pattern in (2) with the core locality properties of extraposition, and sketch the basics of its semantic motivation. We then turn to more complex phenomena involving interactions between extraposition, movement and reconstruction in section 3, and show that the account we propose also naturally covers these facts in a way that unifies them with (3). We discuss some open questions and loose ends in section 4.

1 Extraposition: Descriptive generalizations and previous analyses

We will use the term “host” for the phrase that an extraposed element is understood to modify, adjacent to which the extraposed element would canonically appear. So in (1), the relevant hosts are *(a) book* and *somebody*. We will restrict our attention to extraposed *adjuncts*: we take the similar-looking construction where complements appear at the right edge of a sentence to be a different phenomenon, and offer some evidence for this distinction in subsection 4.3.

At first glance, this construction looks to be a good candidate for a movement anal-

ysis, where the extraposed element moves from its canonical position to its rightmost position. This idea quickly runs into problems, however: the locality constraints on extraposition do not seem to be the familiar ones discovered through analysis of wh-movement. For example, extraposition is more constrained than wh-movement in that it is strictly clause-bounded (Ross's (1969) Right Roof Constraint).

- (4) John explained [that he met a man [with blond hair]] to everyone
- (5) John explained [that he met a man __ yesterday [with blond hair]] to everyone
- (6) * John explained [that he met a man __ yesterday] to everyone [with blond hair]

Baltin (1981) argues that the locality of extraposition is actually even more restricted than the Right Roof Constraint dictates. The position of an extraposed element depends on the position of its host — roughly, the higher the host, the higher an extraposed element will attach — in contrast to the way wh-movement targets SpecCP irrespective of the corresponding base position. Evidence for this (also noted by Guéron (1980)) comes from VP-fronting and VP-ellipsis: elements extraposed from subjects are necessarily *excluded* from the constituent targeted by these operations, as shown in (7), whereas elements extraposed from objects are necessarily *included*, as shown in (8).

- (7) [Some __] would ride with Fred [who knew his brother].
- a. Ride with Fred, some would who knew his brother.
- b. * Ride with Fred who knew his brother, some would.
- (8) John said that he would call [people __] up [who are from Boston], and ...
- a. * ...call people up he did who are from Boston.
- b. ...call people up who are from Boston he did.

Baltin concludes from these facts that extraposed constituents with subjects as their hosts are adjoined to IP, whereas those with objects as their hosts are adjoined to VP. More generally, he draws the generalization in (9).

- (9) An extraposed phrase is adjoined to the first maximal projection that dominates its host.

This leads Baltin, pursuing a rightward movement account of extraposition, to propose a constraint he dubs Generalized Subjacency as a step towards unification of leftward and rightward movements.

- (10) Generalized Subjacency (Baltin 1981)

In the configuration [$X \dots [A \dots [B \dots Y \dots] \dots] \dots X']$:

X and Y cannot be related where A and $B =$ one of NP, PP, and either or both of S and S' ;

X' and Y cannot be related where A and B are both maximal projections.

The idea is that rightward movement is similar to leftward movement in not being able to cross more than one bounding node, the only difference being that while only certain distinguished nodes count as bounding nodes for leftward movement (the specific choices made do not matter here), *any* maximal projection counts as a bounding node for rightward movement. The effect is that if an adjunct is attached to host HP which is in turn the complement/specifier of some XP, then this adjunct can be extraposed out of HP into the domain of XP, but no further. This explains the asymmetry between subject-hosted and object-hosted extraposition in (7) and (8), and subsumes the Right Roof Constraint.

But leftward and rightward movements appear to differ in further ways not predicted by Generalized Subjacency. Restrictions on wh-movement of the sort captured by the CED (Cattell 1976, Huang 1982) do not generally apply to extraposition, which can freely target, for example, subject-internal constituents (as we have seen in (7)). Note that any attempt to analyse subject-island effects as (leftward) subjacency violations will not solve this problem, because no choice of leftward-movement bounding nodes in (10) will predict a pattern where leftward movement is *more* restricted than rightward movement.² A movement account of the possibility of extraposition out of subjects

would therefore need to parametrize whatever enforces CED effects by the direction of movement, as well as parametrising subjacency as Baltin does.

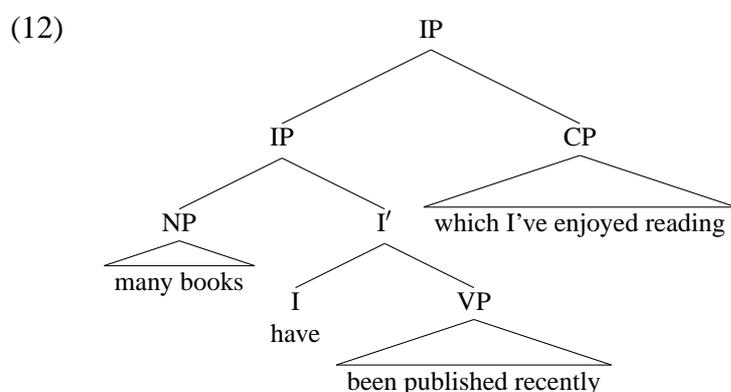
Stepping back now, consider the ways in which the dependency between an extraposed adjunct and its host is unlike wh-movement/topicalization: it is insensitive to whatever particular properties of subjects makes them islands, and it is insensitive to whatever particular properties of (say) NP and S distinguish them from other structural nodes for the purposes of leftward movement. Extraposition is reminiscent of wh-movement only in that a constituent is linearized in a position that is, intuitively, “not where it is interpreted” — but as (10) makes clear, the relevant displacement is *extremely* local. Viewed in this light, this dependency between an extraposed adjunct and its host is more analogous to base-generated dependencies than to those derived by movement. In the account we present below, the lack of CED effects under extraposition follows naturally from the fact that extraposition will not be derived via any sort of movement, and the locality of extraposition encoded by the rightward case of Generalized Subjacency will follow from the particular mechanisms by which we permit adjuncts to be linearized in a position not adjacent to their hosts.

There is another respect in which extraposition is, upon reflection, unlike movement. The leftward case of Generalized Subjacency is a *constraint on* rules of movement (e.g. wh-movement, topicalization) which allows or disallows particular instances of movement, the target position of which is dictated by the *rule*, not the constraint. If wh-movement to a particular SpecCP position violates subjacency, the result is not wh-movement to some other position that is sufficiently local; the movement operation dictates the target position, and is either allowed or disallowed accordingly. Rightward movement (if it is what underlies extraposition) has a different character: the rightward case of Generalized Subjacency is, roughly speaking, a rule and a constraint in one. There does not seem to be a rightward movement extraposition *rule*, with its own properties, that is *constrained by* the distinct axiom of Generalized Subjacency in the way that wh-movement is, for example.³ Rather, extraposition seems to be a particular way

of attaching to a host, which (like being a complement or specifier) results in appearing at a particular position *relative to* this host, albeit slightly non-local.

The possibility that extraposed elements are related to their hosts by local means has been suggested by Culicover and Rochemont (1990), following ideas from Guéron (1980) and Guéron and May (1984).⁴ Culicover and Rochemont argue for an analysis where “extraposed” elements are simply base-generated in their surface position, and interpretively linked to their hosts via a government relation which holds at s-structure. On this view, the sentence in (11) above would have a structure along the lines of (12).

(11) Many books have been published recently which I’ve enjoyed reading



The dependency between *many books* and *which I’ve enjoyed reading* is established purely in virtue of the government relationship that holds between these two phrases at s-structure. Both of these phrases are in their base positions (ignoring possible movement of the subject from a VP-internal position). An extraposed element modifying an object would be base-generated right-adjoined to VP, rather than to IP, and would therefore be as local to its object host as the relative clause in (12) is to its subject host.

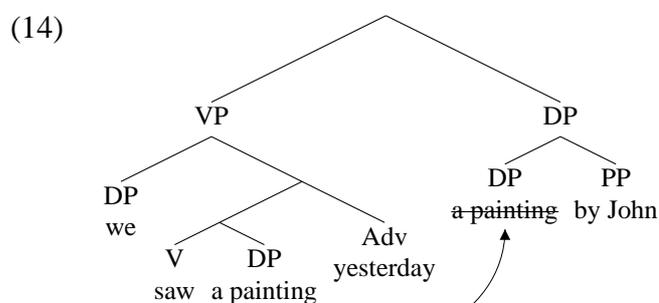
As Culicover and Rochemont point out, this analysis avoids the problems that arise for movement-based accounts of extraposition in the manner discussed above: extraposition is insensitive to the usual bounding nodes and to CED-type constraints because it involves no movement, and is strictly local because it arises as a result of weakening, only slightly, the locality conditions on head-modifier dependencies among base-generated constituents.

The account we present below is largely in agreement with that of Culicover and

Rochemont (1990). Our account improves on it, however, by deriving the particular manner in which, and degree to which, extraposed elements can appear separated from their hosts from an independently motivated account of the flexibility of adjuncts. The weakening which Culicover and Rochemont were forced to stipulate emerges as a natural possibility from the framework we build on, which we describe below in section 2. Furthermore, the analysis of adjunction we draw on is driven by an explicit formulation of how semantic composition of an adjunct with its host proceeds, whereas the details of how to achieve this in a situation like (12) — as opposed to how to delimit the class of syntactic configurations in which it *can* (and cannot) be achieved — are left relatively open by Culicover and Rochemont.

A related difference between our analysis and that of Culicover and Rochemont is that ours is intended only as an account of the extraposition of adjuncts; as mentioned earlier, we leave aside extraposition of complements, which behaves differently in some cases, and which we therefore take to be a separate phenomenon. In this regard we follow Fox and Nissenbaum (1999), who likewise present an analysis of extraposition that applies only to adjuncts. Fox and Nissenbaum’s central idea is that in (13), the adjunct *by John* is, in an important sense, *not* linearly separated from the host *a painting*; this is so because the host has undergone covert rightward movement (specifically, QR), and *by John* adjoins to the unpronounced copy of *a painting* that is at the right edge of the sentence. This idea is illustrated, abstracting away from irrelevant details, in (14).

(13) We saw a painting yesterday by John



Fox and Nissenbaum adopt the idea of counter-cyclic adjunction from Lebeaux’s (1988) analysis of the contrast mentioned earlier in (3), and justify this by pointing out that

there are analogous Condition C obviation effects in cases of extraposition; we return to this in section 3. By combining counter-cyclic adjunction with the idea that covert movement is simply movement where the “bottom” copy is pronounced (rather than part of a distinguished component of the grammar that applies strictly after all overt operations have taken place), they are in effect able to analyse extraposition while maintaining the idea that an adjunct is linearized directly adjacent to (some copy/occurrence of) its host: the apparent separation of an adjunct from its host arises from the fact that the adjacent copy/occurrence of the host is phonologically null.

This proposal has both significant similarities to, and significant differences from, our own. We will also suppose that adjuncts have a distinctive ability to be added “late”, and will connect this with Condition C obviation effects. But we will generalize this idea beyond the version of it assumed by both Lebeaux (1988) and Fox and Nissenbaum (1999), in such a way that it will have interesting consequences even when the target site of the adjunction does not undergo any movement (overt or covert). We also do not make use of unpronounced copies/occurrences to give the appearance of discontinuity between the adjunct and its host: for us the late adjunction mechanism itself will have the effect of linearising the adjunct at a distance from its host, although this distance will turn out to be naturally constrained in accordance with Baltin’s Generalization.

2 The flexibility of adjuncts

In this section we introduce an analysis of adjuncts from which the possibility of extraposition, and the constraints on it discussed in section 1, emerge naturally. The treatment of adjunction is closely based on that presented in Hunter (2010), and unifies the phenomenon of extraposition with the other well-known properties of adjunction illustrated in (2) and (3) above.

The system we adopt is independently motivated by a restrictive theory of the semantic composition of neo-Davidsonian logical forms (Davidson 1967, Parsons 1990, Schein 1993), depends on a distinctive implementation of syntactic movement as merely

re-merging (Epstein et al. 1998, Stroik 1999, Chomsky 2004) based on work by Stabler (2006) and others, and unifies the prohibition against extraction from adjuncts (i.e. adjunct island effects) with the prohibition against extraction from moved constituents (i.e. freezing effects). These features of the framework will not be covered in significant detail here; see Hunter (2010, submitted).

To foreshadow the basic idea, the proposal will be roughly that just as the VP-adjunct *quietly* in (2), repeated here, can be treated either “low” (as when it is included in the fronted constituent) or “high” (as when it is excluded from it), so can an NP-adjunct; the low option yields the non-extrapolated word order, and the high option yields — or more precisely, can yield (there are two alternatives) — the extrapolated word order.

- (2) a. Read books quietly (is what) John did
b. Read books (is what) John did quietly

Thus given our account of extraposition, one could say that (2b) is derived via “extraposition” of the adverb into TP and fronting of VP — but it is crucial to realize that when we say this there is no sense in which the adverb begins in VP and is then relocated in a higher position before VP is fronted. Neither (2a) nor (2b) is derived from the other; nor is the extrapolated placement of NP-adjuncts derived from a more canonical placement.

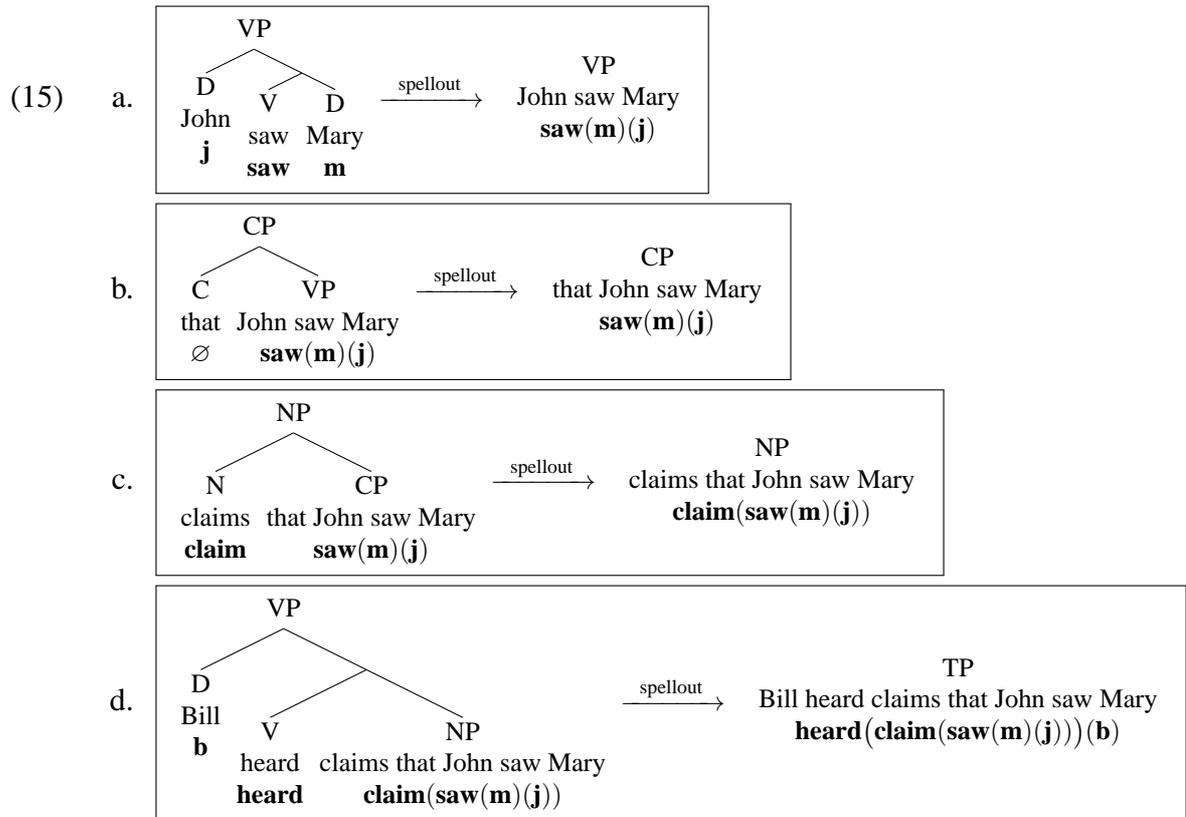
We begin by outlining some crucial background concerning the cyclic nature of interpretation in this system in subsection 2.1. We then show how adjuncts fit into this picture in a way that naturally predicts the possibility of extraposition in subsection 2.2, and in subsection 2.3 demonstrate how this accounts for the exact patterns and locality constraints introduced in section 1.

2.1 Cyclic interpretation

A central assumption is that each maximal projection is a spellout domain. Hence a derivation is naturally partitioned into “chunks”, or “phases”. During each chunk C, there is a single syntactic head X such that every merge step in C establishes either a complement or a specifier of X. At the end of a chunk or phase, spellout applies and

produces a word-like object, lacking internal syntax but with the semantics, phonology, and formal features of the derived XP, which then serves as a constituent that can participate in a subsequent chunk of the derivation.

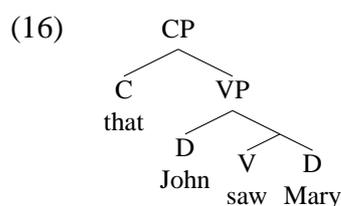
The basic idea of this cyclic spellout at every maximal projection is illustrated in (15), adopting for now a highly simplified clausal structure. Each syntactic unit is written with its category (e.g. VP) on the top line, its string component (“PF interpretation”) on the next line, and its meaning component (“LF interpretation”) on the third line.



This derivation proceeds in four phases, one corresponding to each maximal projection. The particular maximal projections assumed here obviously abstract away from many details, and the semantic values shown are really no more than placeholders making explicit the fact that *some* sort of semantic composition takes place at each application of spellout; we will shortly say more about the particular rules of semantic composition we assume. But the simplified picture illustrates the key idea: as soon as all pieces of an XP have been assembled, spellout applies and “flattens” those pieces into a word-like object, and it is in virtue of the fact that spellout creates these word-like objects

— let us call them “units” — that the system can act recursively. The unit produced in (15a), for example, has formal features categorising it as a VP, has phonological features corresponding to the string *John saw Mary* that results from concatenating (or “linearising”) the string components of the three lexical items, and semantic features corresponding to the meaning (for now, say **saw(m)(j)**) that results from composing the meanings of the three lexical items; just as the lexical item *Mary*, for example, has formal features categorising it as a D, has phonological features corresponding to the string *Mary*, and semantic features corresponding to **m**. This VP unit participates in the derivational operations of the CP phase in just the same way that the D unit *Mary*, say, participated in those of the previous phase; whether it is the result of a previous application of spellout or a lexical item drawn from the lexicon is insignificant. It may be helpful to note that the overall effect is reminiscent of categorial grammar, in that phonological and semantic composition occur frequently and in tandem. (We use the term “phonological composition” roughly interchangeably with “linearization”.)

Notice that at no point in the derivation are there *two* distinct projections with internal structure. Each phase combines a head unit X with one or more other units that are complements or specifiers of X; and since it is *units*, not tree-shaped structures, that are selected as complements and specifiers, the XP must be spelled out into a unit before any projection of X can be selected by some higher head Y. For example, even once all the pieces of the embedded VP have been assembled and “the next thing that needs to happen” is for this VP to be selected by the C head *that*, it is not possible to directly combine the structured VP with the C head as shown in (16).

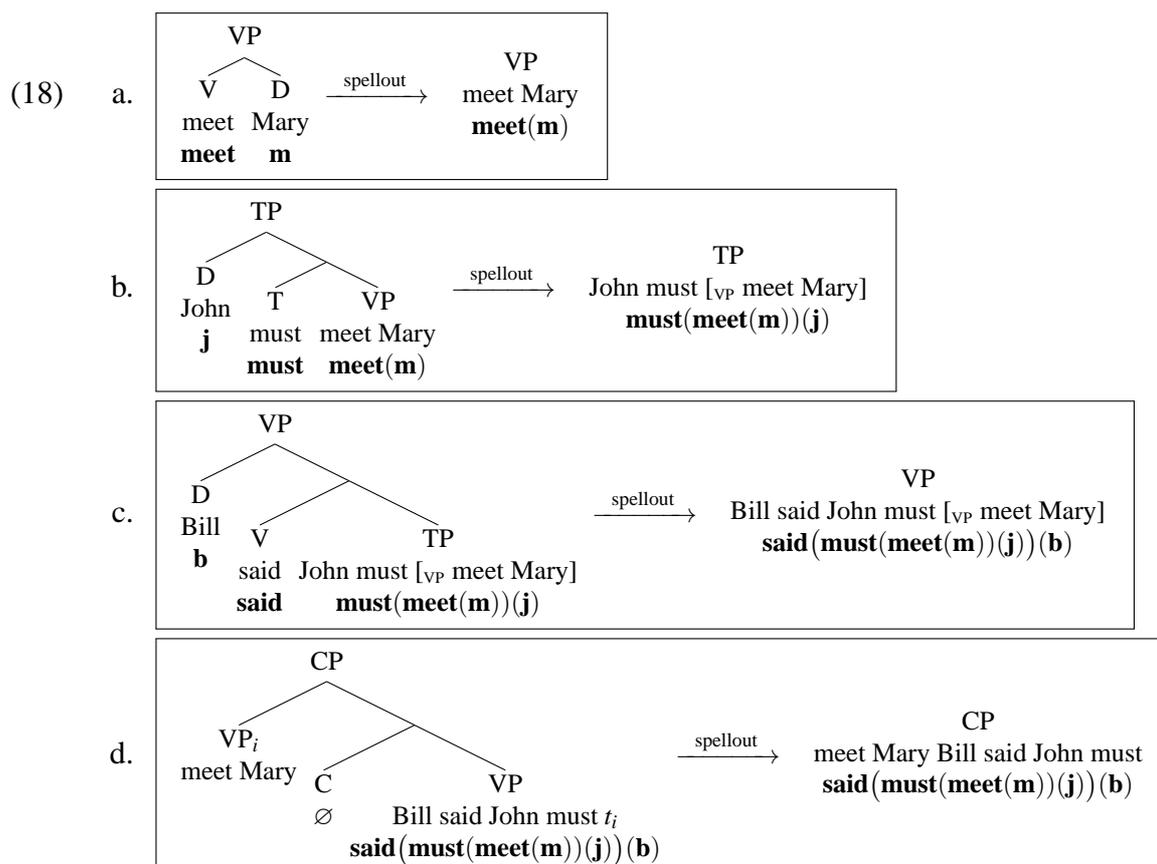


This sort of structure, maintaining at once both the internal structure of the projection of *saw* and the internal structure of the projection of *that*, is simply not constructible in

the system we adopt here. See Hunter (2010) for much discussion, but this restriction on the way syntactic structure-building can proceed will play a key role in accounting for the fact that extraposed adjuncts appear exactly one maximal projection above the one they modify semantically.

In order to see how this overarching idea plays a role in accounting for the desired properties of adjuncts, we will need to show interactions with movement operations. While the full details of how movement interacts with the picture presented in (15) are not worth delving into here, a sufficient version of the mechanics is illustrated for a simple VP-fronting sentence in (18). We make the simplifying assumption that this operation is semantically vacuous.⁵

(17) Meet Mary, Bill said that John must



We assumed in (15) that the objects produced by spellout were entirely unstructured, but this is clearly incompatible with movement operations: if there were absolutely *no* internal structure to the object that is produced at the application of spellout in (18c) and

then participates in the CP phase in (18d), then it would not be possible to move *meet Mary* to its surface position at the front of the sentence. There is a difference, however, between (i) whether this syntactic object encodes the relatively meagre information that *meet Mary* will separate from *Bill said John must*, and (ii) whether this syntactic object encodes all details of its derivational history, namely that *Bill* was merged as a specifier of *said*, *John* was merged as a specifier of *must*, etc. The system we adopt maintains only the former, the bare minimum of required information, which we represent here as the bracketed [_{VP} *meet Mary*] within the constructed VP object on the right hand side of (18c). Because of the fact that the output of spellout actually has two pieces, *Bill said John must* and *meet Mary*, these can be separated and put in appropriate places during the final CP phase. But to repeat, the end result of the phase in (18c) has, in a precise sense, only enough structure to permit this subsequent separation, and no more; in particular, once spellout applies at the end of the VP phase, no information remains about the structural relations between the verbs *said* and *meet* and their arguments *Bill*, *John* and *Mary*. See Hunter (2010, submitted) for extensive discussion.⁶

It is important to stress that the phonological and semantic features of these objects produced by spellout are “present” in the derivation in just the same way that the phonological and semantic features of a lexical item freshly drawn from the lexicon are. When spellout interprets the small tree structure in (18a), the effect is not to eliminate (or transfer to some inaccessible other place) any phonological or semantic *content*. The tree structure contains two phonological values, *meet* and *Mary*, and the unit resulting from spellout contains a single phonological value, *meet Mary*: none of the content that was previously present has been eliminated, it has only been composed. All that is eliminated is the structure that records how the larger phonological value was computed; in other words, how it was decided that *meet* and *Mary* should be linearized in this particular order. Similar remarks apply on the semantic side: **m** and (say) **meet** are *composed* to form **meet(m)**, but this new value **meet(m)** is as much a part of the unit that acts as the complement of the TP phase as **m** is a part of the unit that acts as the

complement of the VP phase. The fact that this semantic content is present in the tree structure shown in (18b) is what enables it to be further composed with **must** and **j** to produce another “larger” semantic value.

We emphasize these details of our conception of cyclic interpretation because they are important for what follows, and the exact effect of “interpreting” a syntactic object sometimes remains unclear in the other discussions of the topic. The picture we have in mind has much in common with the early “multiple spellout” proposal of Uriagereka (1999), where the effect of spellout is to produce “a giant lexical compound”, “something akin to a word” (Uriagereka 1999:256–257). Other subsequent work on phases suggests a different view where phonological and semantic content is more thoroughly removed from the derivational workspace; where, for example, at the end of each phase one process “hands the SO [syntactic object] already constructed to the phonological component” and another “hands SO to the semantic component”, such that “as soon as the information is transferred it will be forgotten, not accessed in subsequent stages of the derivation” (Chomsky 2008:142–143). To repeat, the effect of spellout in the framework we adopt here is not to eliminate, or transfer to an inaccessible other domain, any phonological or semantic content. The effect is to *compose* phonological and semantic values into larger ones that are henceforth treated as unstructured word-like units. See also Bouchard (2002:343) and Boeckx and Grohmann (2007) on “the recombination problem”, and Hunter (2011:sec. 3.5.2) for discussion with reference to the framework we adopt here.

2.2 *Adjunction*

With this background in mind, we now turn to the treatment of adjuncts. The details are motivated by a particular theory of the semantic composition operations that are used at each application of spellout to construct the semantic values of the newly-produced, larger units.⁷ For ease of exposition we will restrict our attention to some limited but illustrative examples here, namely the range of sentences in (19)–(23).

- (19) John bought books
- (20) John bought books about syntax
- (21) John bought books yesterday
- (22) John bought books about syntax yesterday
- (23) John bought books yesterday about syntax

A central assumption is that the basic, unmarked mode of semantic composition is predicate conjunction. In particular, the semantic value of (20) can be obtained from that of (19) by replacing the predicate satisfied by books with the result of conjoining this with the predicate satisfied by things about syntax, as illustrated schematically by (19') and (20') below. Similarly, the semantic value of (21) can be obtained from that of (19) by replacing the predicate satisfied by buying events with the result of conjoining this with the predicate satisfied by events that happened yesterday; see (19') and (21'). The semantic values of (22) and (23) are identical, with both of the additional conjuncts contributed by the two adjuncts present.

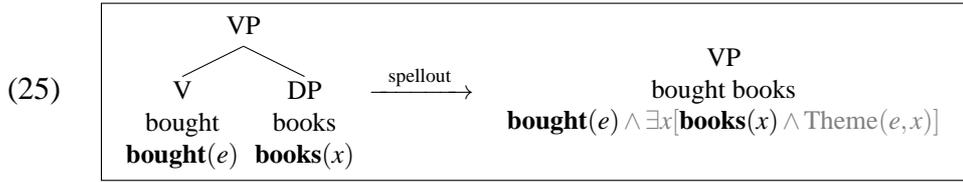
- (19') ... **bought**(e) ... **books**(x) ...
- (20') ... **bought**(e) ... **books**(x) \wedge **about-syntax**(x) ...
- (21') ... **bought**(e) \wedge **yesterday**(e) ... **books**(x) ...
- (22') ... **bought**(e) \wedge **yesterday**(e) ... **books**(x) \wedge **about-syntax**(x) ...
- (23') ... **bought**(e) \wedge **yesterday**(e) ... **books**(x) \wedge **about-syntax**(x) ...

Of course, building up the rest of the semantics for these sentences will require something more than this simple conjunction operation that links an adjunct with its modifiee. Sooner or later something *relational* will have to be said that connects the buyings with the books, for example. We will return to the question of what one needs to add to the basic mechanism of predicate conjunction below, but the crucial idea is that adjuncts are exactly those constituents whose semantic composition does *not* require any such additional logical paraphernalia.⁸ As a result, adjuncts have a kind of

syntactic flexibility that non-adjuncts lack: the compositional assistance that the additional paraphernalia provides is only available in certain syntactic positions and so non-adjuncts must stay “between the flags”, but there is no such restriction on adjuncts. (To foreshadow: the additional paraphernalia is essentially thematic relations, and these are only available in certain syntactic positions under the assumption of Baker’s (1988) UTAH.) Adjuncts are therefore predicted to be able to roam relatively freely, limited only by the very basic requirements imposed by the system of cyclic interpretation introduced above. Because of the prominent role of maximal projections, this turns out to predict exactly the “one phrase higher” pattern that was discussed in section 1.

To illustrate the details now: the VP phase of the derivation of the basic sentence in (19) will proceed by merging *bought* and *books* and applying spellout to the result. This application of spellout, of course, performs both phonological and semantic composition, producing both a string and a meaning for the resulting unit. Adopting neo-Davidsonian logical forms and assuming that thematic relations are structurally determined (Baker 1988, Hale and Keyser 1993), the semantic result of applying spellout to a VP structure like that in (25) will be of the form shown in (24), since the complement-of-V position is associated with the thematic role of ‘Theme’. Notice that the existential closure, conjunction and thematic relations are not part of the lexical semantics of the verb; these are introduced by the *compositional rule*, that is used to interpret the phrase comprised (solely) of the DP and the V, following e.g. Carlson (1984), Pietroski (2002, 2005). This also bears some similarity to the approach of, for example, Kratzer (1996) with respect to external arguments, and Borer (2005), except for the crucial difference that for us this extra logical “scaffolding” is also not introduced by additional *syntactic constituents* that combine with the DP and the V: there is no “existential closure head” or “Theme head”. For the particular case considered here, the result is shown in (25), where grey text is used to background the additional logical paraphernalia that is introduced; we will not focus on the details of these additional trimmings, although it will be important to be aware of when they are present and when they are not.

$$(24) \quad \llbracket \mathbf{V} \rrbracket(e) \wedge \exists x[\llbracket \mathbf{DP} \rrbracket(x) \wedge \text{Theme}(e, x)]$$

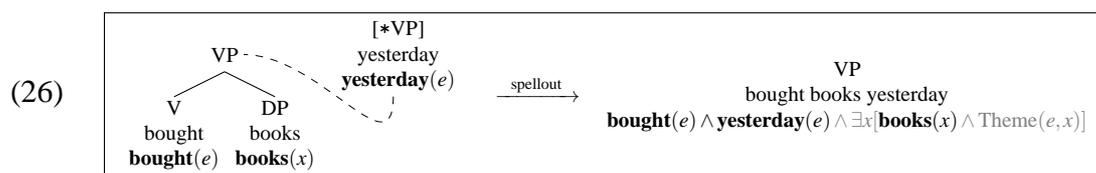


For the purposes of this paper, we abstract away from explicitly quantificational DPs (e.g. *every book*), where an event’s participants must be bound by a higher operator; see Pietroski (2005) and Hunter (2010) for one way to achieve this that is particularly in line with the rest of the semantic assumptions we make here. But the important underlying intuition is that all semantic values are monadic predicates,⁹ and the semantic composition performed here composes the predicate satisfied by buyings, with the predicate satisfied by books, to produce the predicate satisfied by buyings of books (or slightly more precisely, buyings which have books as their theme). This predicate is the semantic value of the VP unit produced in (25), in just the same way that *bought books* is its phonological value.

Note that it was in virtue of its being in the distinguished complement-of-V position that the meaning of *books* could be integrated appropriately with the rest of the phrase. Other similarly enriched compositional rules, parallel to (24) but with other relations (e.g. ‘Agent’) in place of ‘Theme’, are invoked when the structure being interpreted includes certain other distinguished syntactic positions (e.g. specifier of V or *v*). The kind of semantic significance that is assigned to such distinguished positions is exactly what adjuncts do not need in order to be semantically composed with their modifiees. The central idea behind the treatment of adjunction, therefore, is that adjuncts (in contrast to complements and specifiers) are introduced into the derivational workspace, in a sense made precise in Hunter (2010), but never merged. (The operation that introduces new material into the workspace is called “insert”, following Stabler (2006).) Since they never merge, the question of “what they adjoin to” — or in more neutral terms, “what they modify”¹⁰ — hinges not on the question of what they merge with, but rather on *during which phase* they are introduced. The phase during which an adjunct is intro-

duced determines the application of spellout which will be responsible for composing this adjunct (both phonologically and semantically) with other constituents: namely, the application of spellout that concludes that phase.

With this in mind, consider applications of spellout that compose a verb with an object as shown in (25), and what sorts of adjuncts such an application of spellout would be able to integrate into the resulting VP unit. An obvious candidate is a VP-modifying adjunct, such as the adverb *yesterday*, which we take to denote a predicate of events: the VP phase of the derivation of (21) can proceed as shown in (26). For syntactic objects of “adjoining” categories such as adjective and adverb, we will use annotations indicating the category to be adjoined to: hence rather than labelling *yesterday* with a fresh symbol (e.g. *Adv*) denoting the category of adverb, we annotate it with [**VP*]. It will be useful to have this visual reminder that this is the kind of object that “looks for” a VP to combine with.¹¹

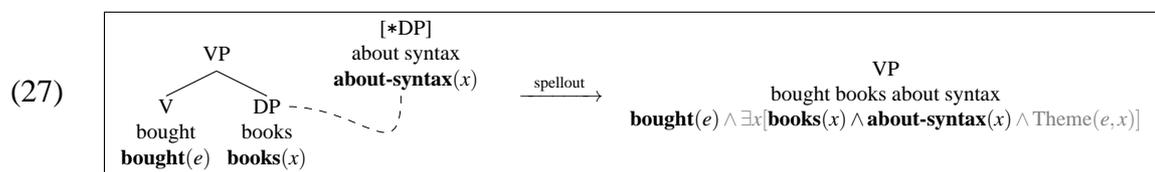


During this VP phase, three distinct elements are introduced into the workspace, but only two of them undergo merge: the head verb *bought* merges with its complement *books*. The other syntactic object, *yesterday*, is introduced during this phase but does not undergo merge. When spellout applies, it inspects the workspace and finds not only a head verb *bought* merged with a complement *books*; it also finds that the workspace contains a further unmerged, “disconnected” element of the sort that modifies a VP, i.e. something marked with [**VP*]. This is all it takes for *yesterday* to be construed as a contributor to the VP unit that spellout needs to construct, as indicated informally by the dashed line in (26), and suffices to discharge the VP-seeking requirement encoded by the [**VP*] annotation on *yesterday*.¹² Spellout therefore incorporates the phonological and semantic content of *yesterday* into the VP unit that it constructs. As regards the linearization of phonological content, the resulting string is not just *bought books*,

but rather *bought books yesterday* (details discussed below); on the semantic side, the adverb’s event predicate will be conjoined with that of the verb, producing the result shown on the right in (26); compare with (21’). Notice that it does not matter whether we think of the adverb’s event predicate being conjoined with the verb itself or the verb phrase as a whole: the results are logically equivalent.

We restrict our attention in this paper to right adjuncts, i.e. adjuncts that appear to the right of their hosts in canonical, non-extrapolated constructions. We assume that the distinction between right adjuncts and left adjuncts is lexically specified; more concretely, one could suppose that our [*XP] annotations actually come in two flavors, say [*’XP] and [*^ℓXP] for right and left adjuncts respectively, and so since *yesterday* is in fact marked as [*’VP] rather than [*^ℓVP], the result in (26) is *bought books yesterday* rather than *yesterday bought books*. But we will continue to simply write [*XP] since we will not deal with left adjuncts (see note 14 below).

Recall now that we take the semantic effect of spellout in the basic, adjunct-free case of (25) to be to compose the two predicates **bought**(*e*) and **books**(*x*), in accordance with the thematic scaffolding determined by their structural configuration. We have seen that one kind of adjunct that can be integrated into the produced VP unit is an adverb that conjoins with **bought**(*e*). A crucial point of our analysis is that such VP-modifiers are not the *only* kind of adjunct that can be introduced during this phase: besides modifiers of the verb itself, this phase can also accommodate modifiers of the other “main ingredient” in the VP, the object. This is illustrated in (27).



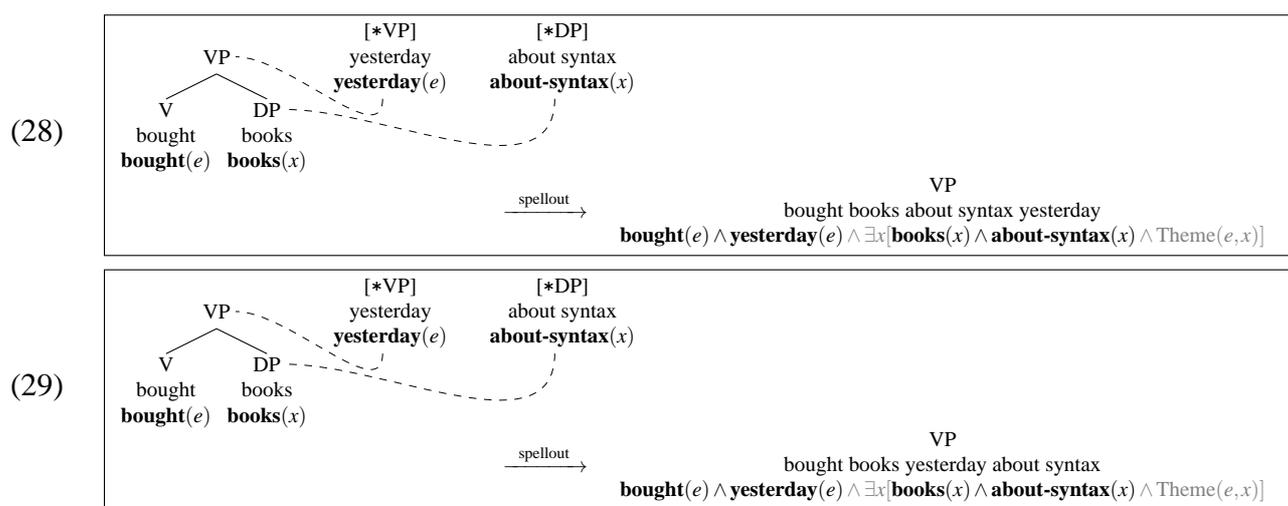
Again, being present in the workspace at this point is sufficient to discharge the DP-seeking requirement encoded by the [*DP] annotation on *about syntax*. The particular way in which spellout now integrates this adjunct into the produced VP unit is by interpreting it as a modifier *of the DP*, as dictated by its [*DP] annotation, and as informally

indicated by the dashed line.¹³ Hence the semantic content of the adjective is conjoined with that of the DP, intuitively “within the scope” of the thematic scaffolding provided by the DP’s syntactic position, as part of the predicate describing the event’s theme; compare with (20’). (We will shortly address any concerns that might be raised by the fact that in (27) we are modifying the object *books after* spellout has applied to complete the object DP phase.) On the phonological linearization side, we propose in this case — an alternative will be introduced later — that *about syntax* appears at the edge of the produced VP unit just as *yesterday* did in (26); more precisely, *about syntax* appears at the *right* edge because, like *yesterday* it is specified as a right adjunct. The general rule here, in other words, is that unmerged elements are linearized at the edge — the choice of left or right edge being determined by the adjunct itself — of the output of the phase where they are introduced, irrespective of the position of the target of *semantic* modification within that phase.¹⁴

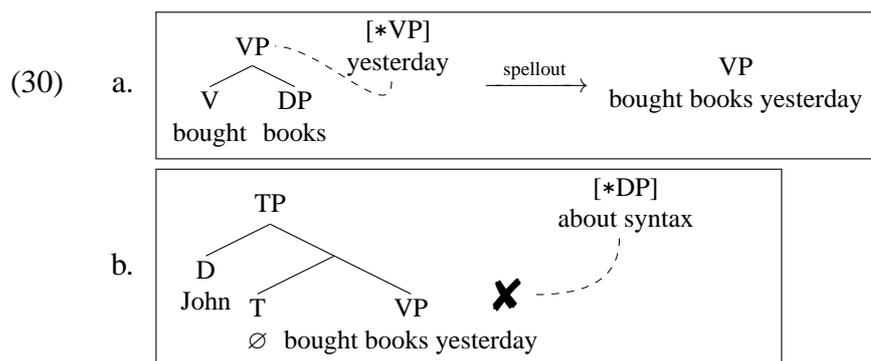
The relationship indicated by the dashed lines in these diagrams is not one that is established as a result of a distinguished “adjoining” operation, distinct from the merge operation that establishes the relations indicated by the solid branches in the tree structure. In (27), nothing happens to the adjunct *about syntax* that does not also happen to the complement *books*: both begin by being introduced into the workspace, and both are eventually incorporated into the produced VP unit. They differ in that *books* undergoes one extra derivational step that the adjunct does not, namely being merged.¹⁵ Although not a crucial point for the purposes of this paper, the explanatory power of this analysis of adjuncts stems from the implementation of this idea, following Hornstein and Nunes (2008), that adjuncts bear a less intricate or less articulated relationship to their heads than complements and specifiers do; this is motivated in turn by the observation that, in a (neo-)Davidsonian setting, adjuncts generally contribute purely conjunctive meanings that can be semantically integrated without the assistance of a theta role. In the current example, they differ from *books* in not needing to be placed in a structurally distinguished position that identifies them as a “thing bought” (or whatever

else) and therefore surrounds them with appropriate thematic scaffolding.

Naturally, given the two possibilities in (26) and (27), it is also possible to introduce both these adjuncts. In this case each of them will be independently interpreted as a semantic modifier of the appropriate XP and their phonological linearization is freely ordered,¹⁶ so this option can produce either (22) or (23), as shown in (28) and (29); compare with (22') and (23').



The ordering shown in (29) corresponds to the extraposition phenomenon: intuitively, the fact that *about syntax* has been introduced late allows it to appear “higher” than its canonical position. But because of the system of cyclic interpretation that we have adopted, this mechanism turns out to naturally produce exactly the locality effects observed by Baltin (1981). Note that while (29) allows the object-modifier to appear at the right edge of VP, it cannot be introduced any later than this, and therefore cannot appear any “higher” than this. The reason is that if this adjunct has not been introduced by the end of the VP phase, it misses its chance to interact with the object DP *books*: in the subsequent TP phase, this DP no longer exists in its own right, since all its phonological and semantic content has been integrated into an unstructured VP unit, as shown in (30). Intuitively, there is no unit in (30b) to which *about syntax* could be appropriately linked via a dashed line, in the notation we have adopted.¹⁷

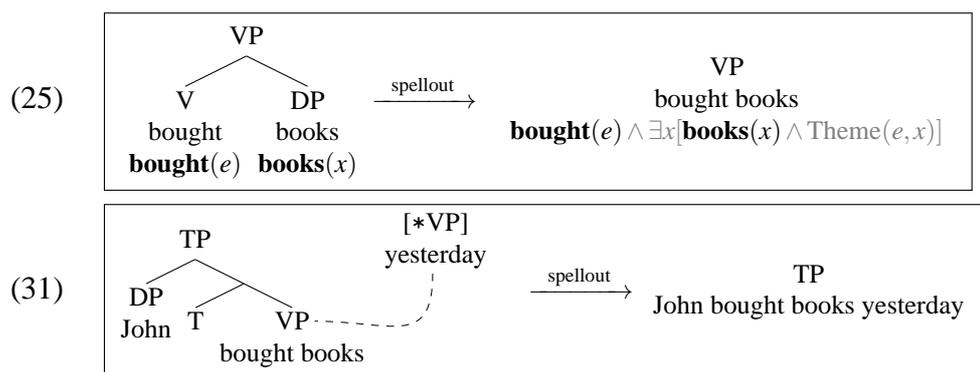


While the application of spellout that concludes the TP phase in (30b) cannot compose an adjunct with the object *books*, it could compose an adjunct with the subject *John*, because this is present in the TP phase just as *books* was present in the VP phase in (27). The application of spellout in (30b) could also compose an adverb with the VP. But just as the VP phase is the last opportunity for object-modifying adjuncts, the TP phase is the last opportunity for subject-modifying and VP-modifying adjuncts.

Returning to the guiding intuitions: the applications of spellout that we have been considering have all had the task of integrating the verb *bought* and its object *books* into a single unstructured VP unit. On the semantic side, this amounts to composing the predicate satisfied by buyings with the predicate satisfied by books, to produce a new “larger” predicate. The crucial idea is that besides these two basic inputs, spellout is also able to integrate certain other predicates (adjuncts) into the VP unit it produces, and the way these other predicates are integrated is by conjoining them either with the predicate satisfied by buyings or with the predicate satisfied by books. The semantic details of how this basic intuition can be extended to other domains are beyond the scope of this paper, but the general consequence for syntactic derivations is the following: an XP-modifying adjunct, with an annotation of [*XP], can be introduced either (i) during a phase where an XP is being constructed (i.e. a phase “headed by” an X head), as illustrated in (26), or (ii) during a phase where an XP is present as a complement or specifier of some other head, as illustrated in (27).

This means that being introduced into the VP phase we have been considering is the “earlier” of two possibilities for an adverb like *yesterday*, and the “later” of two

possibilities for *about syntax*. The earlier alternative for *about syntax* is to be inserted during the construction of the DP it modifies. The later alternative for *yesterday* is to be inserted during whatever phase immediately follows the VP phase. Let us keep things simple and suppose that this is TP. Then an alternative derivation for the sentence in (21) — besides the one indicated in (26) — begins by constructing an adjunct-free VP as in (25), repeated here, and then embeds the resulting VP unit in a TP as in (31).

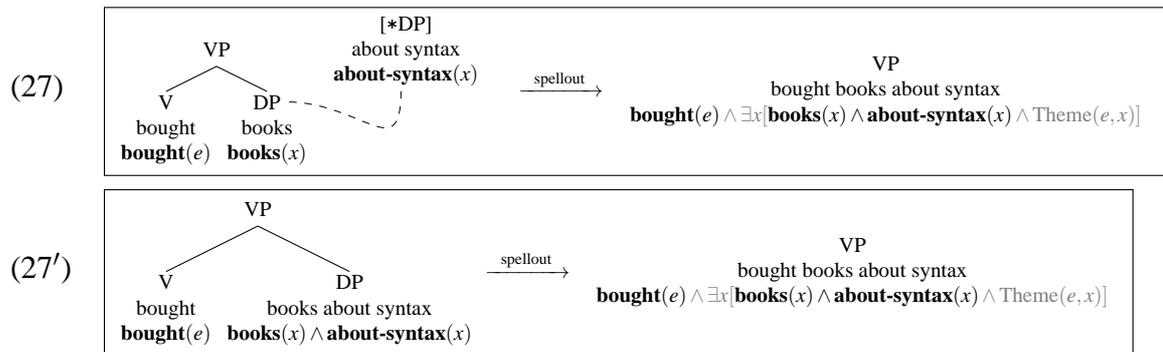


Here *yesterday* is modifying an XP in a complement position, just as *about syntax* did in (27). And just as being introduced during the VP phase as in (27) was the latest possible option that allows *about syntax* to semantically modify *books*, being introduced during the TP phase is the latest possible option that allows *yesterday* to semantically modify *bought (books)*.

One may at first wonder how it is that the VP in (31) can be modified by an adjunct, after this VP has been “spelled out” as shown in (25) (and similarly, as noted earlier, how the object DP can be modified by an adjunct (27)). But recall from the discussion at the end of section 2.1 that this VP, with its formal syntactic features, semantic content and phonological content, is present during the illustrated TP phase just as much as, say, the T head is (likewise with its formal syntactic features and semantic and phonological content). The fact that the VP has been “spelled out” means that it now exists only as an unstructured unit, and hence that further derivational interactions can only involve the entire phrase as a whole, rather than just a sub-part of it. This means that adjunction to (i.e. conjunctive modification of) the VP is still possible in (31); but composition as an *argument* of the VP is not, since this requires reference to its structural innards, nor

is adjunction to the object *books*, as noted in discussion of (30b).

It should be clear, but it is worth stressing, that while there are two distinct *ways to derive* a sentence with a single adjunct such as (20) or (21), varying in the point at which the adjunct is introduced (and hence four distinct ways to derive (22)), the two distinct derivations do *not* give rise to any semantic ambiguity. This is most clearly seen by comparing the “late” introduction of the object-modifying adjunct, illustrated in (27) and repeated here, with the way the VP phase would proceed if this adjunct had been introduced instead at the earlier DP phase, as illustrated in (27'). We have already seen how the adjunct is semantically interpreted in (27); it is straightforward to see, given (24), that the semantic result is the same in (the arguably more conventional) (27').

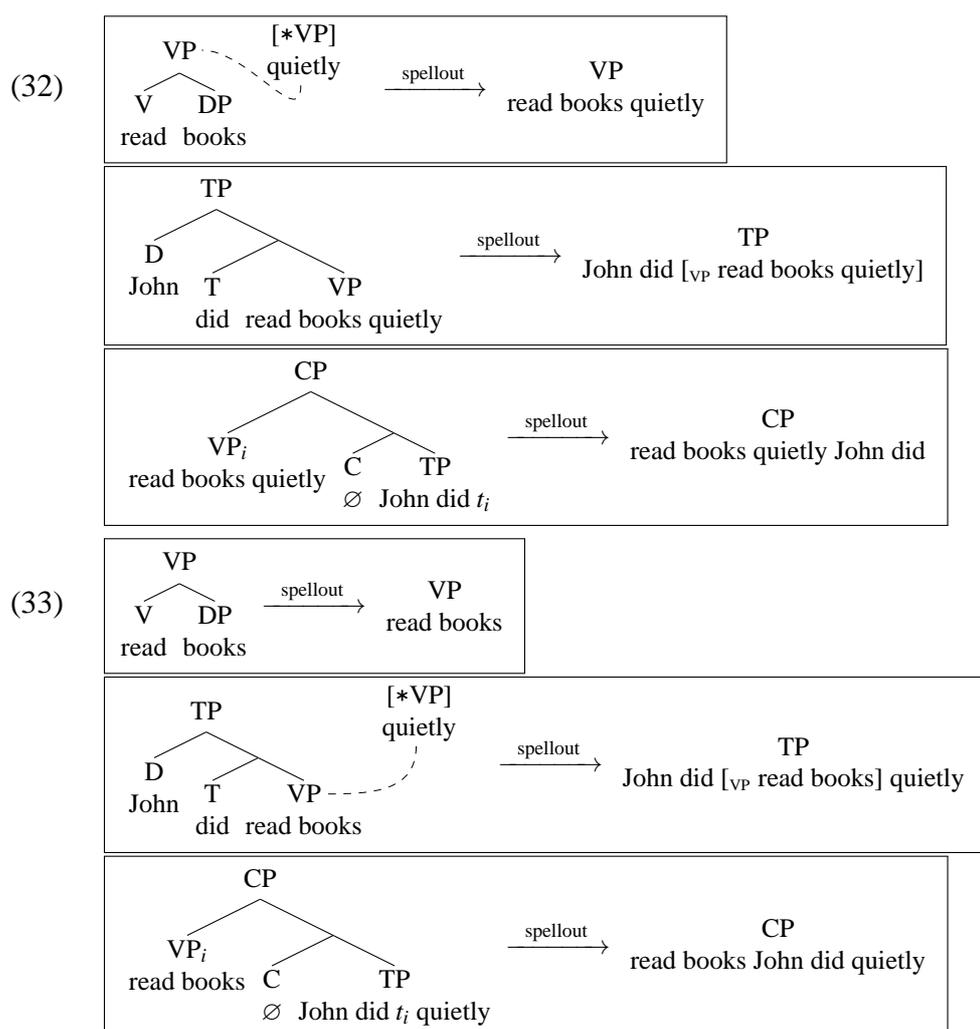


2.3 Explaining the properties of extraposition

Let us now demonstrate carefully how this mechanism of late insertion, and the limitations on “how late” adjuncts can be inserted that result from the assumptions about cyclic interpretation, derive exactly the desired range of possibilities for extraposed and non-extraposed adjuncts in interaction with VP-fronting. A basic case of this transformation has already been illustrated in (18), and it serves as a unified probe for the key constituency properties of (i) VP-modifying adjuncts, as shown in (2), (ii) extraposed subject-modifying adjuncts, as shown in (7), and (iii) extraposed object-modifying adjuncts, as shown in (8). The basic pattern is that extraposed subject-modifiers are obligatorily *excluded* from the fronted fragments, extraposed object-modifiers are obligatorily *included*, and adverbs have the flexibility to do either.

- (2) a. Read books quietly (is what) John did
 b. Read books (is what) John did quietly
- (7) [Some __] would ride with Fred [who knew his brother].
 a. Ride with Fred, some would who knew his brother.
 b. * Ride with Fred who knew his brother, some would.
- (8) John said that he would call [people __] up [who are from Boston], and ...
 a. * ... call people up he did who are from Boston.
 b. ... call people up who are from Boston he did.

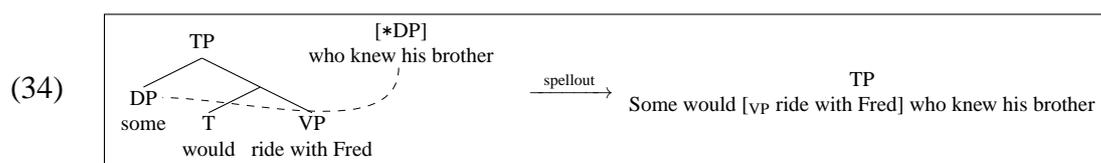
The pattern in (2) emerges straightforwardly from the possibility of either introducing *quietly* in the canonical, straightforward manner during the VP phase as shown in (32), or introducing it “late” during the subsequent TP phase as shown in (33).



Recall from (18) that a constituent out of which a subpart will move is viewed as an object with two pieces, which can be separated and rearranged at a later point in the derivation. In (32), for example, the phonological output of the TP phase is an object comprising two strings, *John did* and *read books quietly*, which we indicate with brackets around the latter. Now, a consequence of the way movement is implemented in the system we adopt is that it is the *output of the VP phase* that ends up separated from the rest of its clause (i.e. placed in square brackets) and is subsequently manipulated by VP-fronting. What (32) and (33) demonstrate is that the choice of whether to introduce the adverb early or late dictates whether or not it is included in this unit.

We will now see that extraposed subject-modifiers are necessarily not part of the output of the VP phase, and that extraposed object-modifiers necessarily are; hence the observations in (7) and (8). The “introduce early” option for these relative clauses yields the canonical, non-extraposed word order (recall (27')), so our predictions for the behavior of extraposed relative clauses lie entirely in the “introduce late” option.

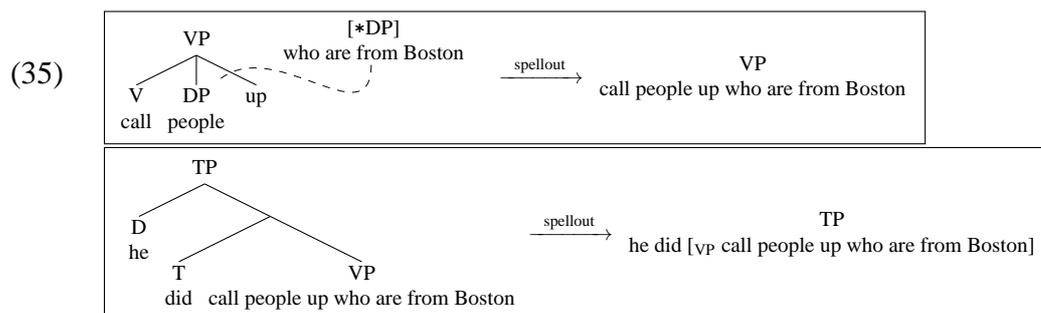
An extraposed subject-modifier is derived as shown in (34): it is introduced during the TP phase, at which point the unit that will eventually be manipulated by VP-fronting has already been constructed. The relative clause here is therefore necessarily not included in the fronted fragment in (7).



The subject *some* here is accessible for adjunction just as the complement *books* was in (27). While we abstract away from their internal structure, we take relative clauses such as *who knew his brother* to denote a predicate that is composed conjunctively with the target of adjunction, analogous to the interpretation of *about syntax* earlier.¹⁸

The derivation of an extraposed object-modifier proceeds as shown in (35). The particle *up* is necessary to distinguish between the extraposed and non-extraposed positions of this relative clause. For concreteness we illustrate with a simple ternary-branching

structure for this VP, but in order for the analysis we propose to go through all that is necessary is that the object *people* is an argument (complement or specifier) of this VP projection. Given this assumption, the relative clause *who are from Boston* can be introduced during the phase where this VP is constructed, and interpreted as a modifier of the object when spellout applies.



This is the latest chance there is for an adjunct to modify the object DP, but it still places the relative clause inside the VP unit that is produced. Therefore there is no derivation where an extraposed object modifier escapes VP-fronting, as desired based on (8).

Thus the basic idea that an adjunct modifying a particular XP can be linearized at the edge of the YP that immediately contains XP, naturally predicts both the classic adjunct constituency contrast in (2) and the data in (7) and (8). Note that while Baltin’s generalization dictates that extraposed object modifiers are adjoined to VP, Guéron (1980:642) points out that these modifiers do not behave identically to adverbial phrases that might also be described as “adjoined to VP”. The latter can be either excluded or included in the fronted constituent, as shown in (36); in traditional terms, the fronting can apply to either of the two nodes labeled VP, or to either segment of the VP. (Note that (36) is an instance of the pattern in (2), adapted for parallelism with (8).)

- (36) John said that he would call people up [when he got to Boston], and ...
- a. ... call people up he did when he got to Boston.
 - b. ... call people up when he got to Boston he did.

Our analysis maintains a distinction between object-hosted extraposed adjuncts and normal VP-adjuncts, and correctly predicts both (8) and (36).¹⁹ Recall that the flexibil-

ity of the VP-modifying adjunct in (36) arises from the fact that it can either be introduced “canonically” during the VP phase or “late” during the TP phase, the latter option being out of reach of the VP-fronting operation. While the object-modifying adjunct in (8) can likewise be introduced during the VP phase as shown in (35), it does not have the option of being introduced later during the TP phase, out of reach of VP-fronting, because the VP phase *is* the late option for an object-modifying adjunct. Its earlier option is to be introduced inside the object DP itself. An extraposed object-modifying adjunct and a VP-adjunct have overlapping, but not identical, sets of possibilities.

The range of possibilities for adjuncts of the three kinds we have considered is summarized in (37).

	object DP phase	subject DP phase	VP phase	TP phase
(37) object-modifying adjunct	canonical		late	
subject-modifying adjunct		canonical		late
event-modifying adjunct			canonical	late

3 Attachment to moved hosts and consequences for binding

Having seen how our analysis of adjunction naturally derives Baltin’s basic generalization about the heights of extraposed constituents, in this section we consider the ways the basic mechanisms interact with the movement of host phrases and with binding possibilities. The assumptions that are necessary to account for these additional facts are essentially unchanged from those already made by Hunter (2010) in order to derive the anti-reconstruction properties of adjuncts via counter-cyclic attachment in the manner of Lebeaux (1988).

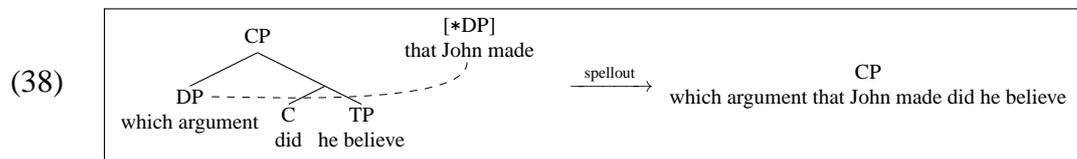
3.1 *Anti-reconstruction effects with adjuncts*

Recall that the contrast in (3), observed by Freidin (1986), prompted Lebeaux (1988) to suppose that the adjunct *that John made* could be added to the structure after the object vacates its VP-internal position, avoiding the Condition C violation.

- (3) a. * Which argument [that John_i is a genius] did he_j believe?

- b. Which argument [that John_i made] did he_i believe?

The mechanism of late attachment of adjuncts that we have adopted straightforwardly generalizes to produce Lebeaux’s effect: just as an adjunct can modify a phrase that has been merged into its base position as the complement or specifier of another phrase, an adjunct can modify a phrase that has been *re*-merged into a complement or specifier position. Hence we have the possibility of introducing the adjunct in (3b) during the CP phase, since the target of modification *which argument* is visible/present in this phase. This is illustrated in (38).



Here the adjunct has been linearized in a manner that differs slightly from what we have seen in earlier examples. Recall that the general rule adopted earlier was that an adjunct is linearized at the edge of the string produced by the application of spellout that interprets them, irrespective of its target of semantic modification; in principle, either the right edge or the left edge, as dictated by the adjunct itself (see note 14), but in this paper we address only right adjuncts. This pattern would place *that John made* at the far right in (38). In order to replicate Lebeaux’s proposal, we must also allow an adjunct that semantically modifies an XP in a complement or specifier position to be linearized at the edge of *that complement or specifier* instead. This option places the relative clause at the edge of the wh-moved DP in (38), producing a surface word order that is no different from that which would result from introducing it earlier during the construction of the DP itself (just as we have assumed that all late-introduced adjuncts produce *semantic* output that is no different from what would result from introducing them at the canonical, earliest possible phase; see footnote 16). This is actually the *only* linearization option introduced by Hunter (2010) — it is sufficient to account for the basic VP-adjunct constituency pattern in (2), since the target of late-modification *read books* is already at the right edge of TP in (33) — and the novel addition of this paper

is the linearization pattern presented earlier in subsection 2.2.

Since we propose that common mechanisms of late adjunction underlie both extraposition and this anti-reconstruction effect, the particular properties that are ascribed to late adjunction in order to produce the anti-reconstruction effect should also be reflected in extraposition. There are two such relevant properties. First, there is the assumption that adjuncts introduced during an XP phase can target not only phrases that have merged into a complement or specifier position of XP, but also phrases that have *moved*, or *re-merged*, to such a position, as *which argument* has in (38). Put differently, phrases in non-base positions can act as hosts for late-introduced adjuncts. Second, there is the assumption that an R-expression contained in an adjunct can escape Condition C effects if the adjunct is introduced late. If we are correct in extending the mechanism of late adjunction, then we should expect correlates of these effects in extraposition; these predictions are borne out, as we will now show.

3.2 Attachment to moved hosts

To begin, note that in the absence of movement, a subject-hosted extraposed adjunct must follow an object-hosted one, as illustrated in (39) (Baltin 2005). This is straightforwardly predicted by the original generalization in (9) and by our account of it, since the subject modifier occurs in the TP domain and the object modifier in the VP domain.

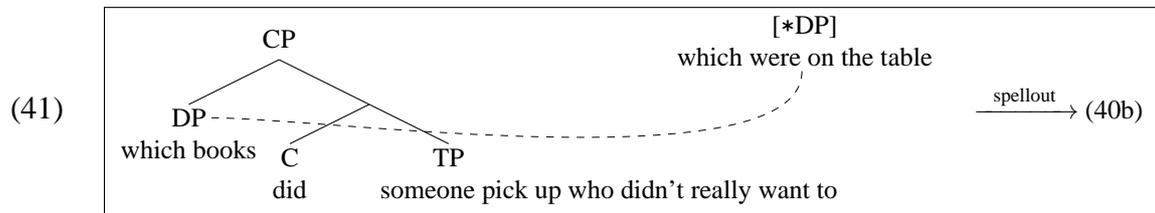
- (39) a. Someone picked some books up [which were lying on the table] [who really didn't want to].
- b. *Someone picked some books up [who really didn't want to] [which were lying on the table].

If the object is moved to a higher position, however, the acceptability of the “subject-adjunct then object-adjunct” order improves dramatically, as shown in (40b).²⁰

- (40) a. ? Which books did someone pick up [which were on the table] [who didn't really want to]?

- b. Which books did someone pick up [who didn't really want to] [which were on the table]?

This is exactly what would be predicted based on the assumption that phrases in non-base positions can license late adjunction: when the CP is being constructed and *which books* moves into the sentence-initial specifier position, this provides a late point in the derivation for attachment of the relative clause *which were on the table* which was not available in (39b). The CP phase of this derivation is shown in (41); note that this is analogous to (38), the only difference being whether the adjunct is linearized at the edge of its host DP (as in (38)) or at the edge of the CP phase (as in (41)).



3.3 Obviation of Condition C effects

If we are correct in taking extraposition with a moved host to be derived by the same mechanisms that yield Lebeaux's examples, then we should expect that the higher attachment site of an extraposed adjunct that is licensed by movement of the host should likewise obviate Condition C effects. This turns out to be correct. Culicover and Rochemont (1990:42) note the contrast in (42).²¹ The R-expression *John* contained in the extraposed adjunct hosted by an in-situ object in (42a) remains susceptible to Condition C effects induced by the subject; but if the object undergoes *wh*-movement, the effect is eliminated and coreference is possible.

- (42) a. * He_i invited several girls to the party [that John_i dated in high school].
 b. How many girls did he_i invite to the party [that John_i dated in high school]?

This follows from our analysis, since the extraposed adjunct must be introduced during the VP phase in (42a), but can be introduced later during the CP phase in (42b).

An analogous pair, modeled on (40) and the derivation in (41), is given in (43). Note again the parallel between (41) and avoidance of the Condition C effect in (38).

- (43) a. * Which books did someone give him_i [that John_i had asked for] [who didn't really want to]?
b. Which books did someone give him_i [who didn't really want to] [that John_i had asked for]?

Not only is the ability of this late attachment to obviate Condition C effects carried over from Lebeaux's examples to cases like (42), but so is the *restriction on* late attachment that limits it to adjuncts. Rightwards displaced complements do not appear to permit the coreference possibilities that are assumed to be licensed by late-attachment: (44a) is analogous to (42b) and therefore avoids the Condition C violation, but the minimally different (44b) with a complement clause does not.

- (44) a. Which argument did he_i reject [that John_i had previously supported]?
b. * Which argument did he_i reject [that John_i was a thief]?

Similarly, Fox and Nissenbaum (1999) note that extraposition of a relative clause obviates the Condition C violation in (45) — where the host has *not* undergone wh-movement — but that the rightward displacement of a complement clause fails to do so in (46).²² This connects the obviation of Condition C effects, which are most easily investigated in the context of moved hosts, back to the cases of extraposed modifiers with in-situ hosts we began with in section 2.

- (45) a. * I gave him_i an argument [that supports John_i's theory] yesterday
b. I gave him_i an argument yesterday [that supports John_i's theory]
(46) a. * I gave him_i an argument [that this sentence supports John_i's theory] yesterday
b. * I gave him_i an argument yesterday [that this sentence supports John_i's theory]

Recall Fox and Nissenbaum's late-adjunction analysis from section 1; on that view, the account of the contrast in (45) is virtually identical to that of the original Lebeaux contrast, the only difference being that it uses covert rightward QR instead of overt leftward wh-movement. Notice, however, that Fox and Nissenbaum (1999)'s analysis will not easily account for the contrasts noted in (42), (43) and (44), since there is little reason to believe that the host wh-phrases in these examples undergo covert rightward QR *as well as* overt wh-movement. So positing covert rightward QR does not seem to be the correct way to assimilate (45) with the original Lebeaux effect; this suggests that an account of the Lebeaux contrast that depends specifically on the host having *moved* would apparently be missing a generalization. Our proposal instead achieves the desired assimilation by generalising the idea of late attachment in a way that allows it to apply even in the absence of movement of the host.

These complement/adjunct contrasts suggest that we are justified in not providing a unified analysis of extraposed adjuncts and similarly rightwards displaced complements. We return to this point in section 4.3.

3.4 *Predicted restrictions on counter-cyclic attachment*

We have been considering whether the properties of our adjunction mechanisms that are responsible for the classic anti-reconstruction effect are carried over when these mechanisms are invoked by our analysis of extraposition; the observations in the previous two subsections indicate that they indeed are. We can also ask whether there are predictions in the other direction: based on the properties of the underlying mechanisms that are central to capturing the basic generalizations about extraposition, do we derive predictions about exactly where anti-reconstruction should and should not occur? It turns out that anti-reconstruction effects are sensitive to the depth of embedding of the target of adjunction in a manner that parallels Baltin's generalization concerning extraposition.

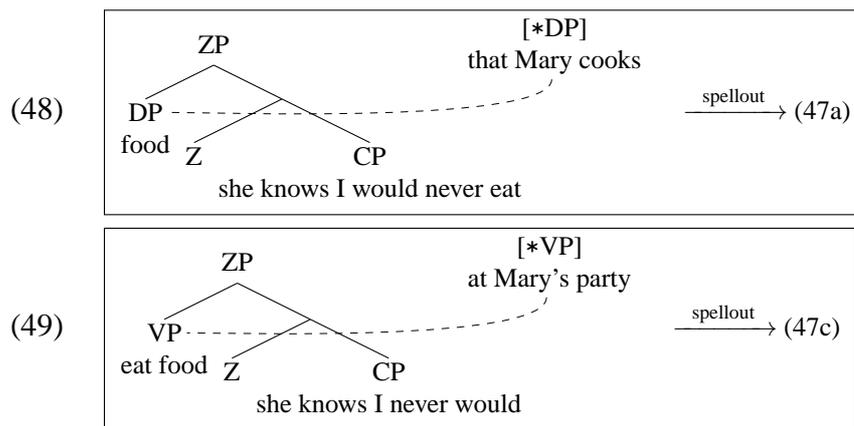
Recall that it is not possible for an object-modifying adjunct, say, to be introduced anywhere higher than the VP phase (in cases where the object does not move). In our

system this follows from the fact that the object DP is not “visible” in any later phases: recall from discussion of (30) that it is not possible to introduce an object-modifying adjunct during the TP phase because by this point the object DP has been incorporated into the unstructured VP. More generally, late introduction of an adjunct is only licensed when the host *itself* is a complement or a specifier of the current phase, and crucially not when the host is properly contained within a complement or specifier of the current phase. (In (30b), the object is properly contained within the VP complement of T.)

The mechanism of late adjunction, which is crucial for capturing the extraposition facts, makes a prediction about counter-cyclic adjunction of the sort Lebeaux introduced: it should be possible only when the target of adjunction *itself* re-merges into a specifier position, and not when a constituent properly containing the target does so. This also appears to be correct: Landau (2007) notes that while the potential Condition C violation in (47a) is avoided, presumably in a manner exactly analogous to Lebeaux’s example, the late adjunction that this requires is apparently not possible in (47b), when what is fronted is the VP which properly contains the target of adjunction *food*. The fronting of a VP only licenses the late introduction of adjuncts targeting the VP itself, as shown in (47c).

- (47) a. Food that Mary_i cooks, she_i knows I would never eat.
 b. * Eat food that Mary_i cooks, she_i knows I never would.
 c. Eat food at Mary_i’s party, she_i knows I never would.

This is exactly as our analysis predicts. Assuming the fronted phrases in (47) move to the specifier of some ZP for concreteness, the relevant phase of the derivation of (47a) is shown in (48), and that for (47c) is shown in (49). The crucial point is that there is no late adjunction option that is analogous to (49) but with a DP-modifying adjunct in place of the VP-modifying one, as would be required to avoid the Condition C violation in (47b), because the intended target *food* is not visible in the required sense.



4 Extensions and loose ends

4.1 Extraposition in other languages

We have thus far restricted our attention to English, which raises the question of whether our account will extend to other languages. The crucial issue is whether extraposition in other languages also displays the locality requirements described by Baltin's Generalization. A number of authors have reported data that suggest this is the case. The following French examples from Abeillé (1994:477), for example, show that extraposition from inside a complex subject is disallowed, as Baltin's Generalization predicts.

- (50) a. Notre crainte [d'un échec soudain et définitif] était grande
 our fear of a failure sudden and final was great
 'Our fear of a sudden and final failure was great'
- b. Notre crainte était grande [d'un échec soudain et définitif]
- (51) a. Notre crainte de nouveaux exemples [de corruption au sommet] était
 our fear of new examples of corruption at the top was
 vive
 great
 'Our fear of new examples of corruption at the top was great'
- b. * Notre crainte de nouveaux exemples était vive [de corruption au sommet]

Wiltschko (1997) proposes an account of extraposition in German that essentially enforces Baltin's Generalization, and presents a collection of facts (pp.386–388) sup-

porting this pattern. First, in (52) we can observe that a relative clause at the far right of a clause can modify the subject *einer der Männer*, but not the subconstituent *Männer*.

- (52) a. Einer der Männer ist gekommen [der gerne Bier trinkt]
 one of-the men is come who(SG) gladly beer drinks
 ‘One of the men who likes to drink beer came’
- b. *Einer der Männer ist gekommen [die gerne Bier trinken]
 one of-the men is come who(PL) gladly beer drink
 ‘One of the men who like to drink beer came’

Second, (53) shows that the relative clause modifying *dem Mann* can be extraposed a short distance (plausibly just one phrase), but not to the edge of the clause.

- (53) a. Peter hat [dem Mann [den er kannte] sein Fahrrad] repariert
 Peter has the man whom he knows his bike repariert
 Peter has fixed the man he knows’ bike
- b. Peter hat [dem Mann sein Fahrrad] [den er kannte] repariert
- c. *Peter hat [dem Mann sein Fahrrad] repariert [den er kannte]

Wiltschko notes that (52b) and (53c) become acceptable if the hosts’s determiner (*der* or *dem*) is stressed; she suggests that the correct explanation will relate to the theory of focus, but gives no explanation. We have nothing to add on this matter, unfortunately.

Third, Wiltschko (1997) shows that extraposed German modifiers are subject to the same ordering requirement on as was noted for English in (39).

- (54) a. Der Mann hat das Bier getrunken, [das Maria ihm empfohlen
 the man has the beer drunk which Maria him recommended
 hat], [der sonst nur Wein trinkt]
 has who otherwise only wine drinks
 ‘The man drank the beer which Maria recommended to him who other-
 wise only drinks wine’

- b. * Der Mann hat das Bier getrunken, [der sonst nur Wein trinkt],
 the man has the beer drunk who otherwise only wine drinks
 [das ihm Maria empfohlen hat]
 which him Maria recommended has

This ordering requirement has also been reported for Dutch (de Vries 2002:248).

- (55) a. Een zekere misdadiger heeft de kluis gekraakt [die tweehonderd
 a certain criminal has the safe cracked that two hundred
 diamanted bevatte], [die ook meneer X heeft vermoord]
 diamonds contained who also mister X has killed
 ‘A certain criminal cracked the safe that contained two hundred diamonds
 who also killed mister X’
- b. * Een zekere misdadiger heeft de kluis gekraakt [die ook meneer X
 a certain criminal has the safe cracked who also mister X
 heeft vermoord], [die tweehonderd diamanted bevatte]
 has killed that two hundred diamonds contained

Turning to the interaction of Condition C with extraposition in German, Buring and Hartmann (1997) present the following contrast, where a name inside an extraposed object-modifier induces a Condition C effect, but a name inside an extraposed subject-modifier does not. This can be analysed in a manner that is consistent with our approach.

- (56) a. ?? Es hat ihr_i jemand eine Geschichte erzählt [die Ida_i ängstigte]
 it has her somebody a story told that Ida frightened
 ‘Somebody told her a story which frightened Ida’
- b. Es hat ihr_i jemand eine Geschichte erzählt [dem Ida_i blind vertraut]
 it has her someone a story told who Idea blindly trusts
 ‘Somebody whom Idea blindly trusts has told her a story’

This kind of contrast is often cited as evidence that only the host position matters for Condition C, and that the extraposed positions of the relative clauses is irrelevant;

Büring and Hartmann, for example, argue for a movement-based analysis of extraposition, according to which reconstruction of the relative clauses to object-internal and subject-internal positions produces the contrast in (56). This would be *inconsistent* with our assumptions about Condition C obviation effects from section 3. But we have already seen, in (54), that extraposed subject-modifiers are *not in the same position* as extraposed object-modifiers in German. Therefore (56) may arise not because Condition C treats the modifiers as though they occupy object-internal and subject-internal positions (pre-movement positions for Büring and Hartmann), but rather because of the differing extraposition attachment sites. This would still be consistent with our assumption from section 3 that late introduction of adjuncts can obviate Condition C effects: for concreteness, we could assume for example that the potential binder *ihr* is in a specifier of ν P position such that the relevant domain consists of the VP that is the ν P's complement, and that whereas the object-modifier in (56a) is introduced in the VP phase, the subject-modifier in (56b) is introduced in the ν P phase.²³

There are, however, also some reported counterexamples to Baltin's Generalization for these same languages. For example, the relative clauses in German (57) and Dutch (58) modify a subconstituent of the object, and yet appear at the far right of the clause. (Examples from Kiss (2005:285) and Koster (2000:9) respectively.)²⁴

- (57) Man hat die Frau des Boten beschimpft, [der den Befehl
 one has the wife of the messenger insulted who the command
 überbrachte]
 delivered
 'The wife of the messenger who delivered the command was insulted'
- (58) Hij heeft met de moeder van de vrouw gesproken [die alles wist]
 he has with the mother of the woman spoken who all knew
 'He talked with the mother of the woman who knew everything'

Similarly, the following example from Müller (1995:218) shows that an object-modifying adjunct can appear to the right of a two-verb cluster. Assuming that *gelesen* and *hat* both head their own head-final VPs, Baltin's Generalization would predict that the relative clause should be able to adjoin to the lower VP and thus appear immediately to the right of *gelesen*, but should not be able to go any further.

- (59) daß sie Fritzens Buch gelesen hat [über die Liebe]
 that she Fritz.GEN book read has about the love
 'that she has read Fritz's book about love'

One possibility is that the counterexamples showing extraposition out of complex DPs might be related to Wiltschko's (1997) observation that the locality requirements can be relaxed in the presence of stress and/or focus. In the following subsection, however, we discuss some similar cases where these locality requirements appear to be weakened and — while we cannot explain *why* they are weakened — the broad structure of the framework we adopt makes some further correct predictions on the basis of interactions between the weakened locality domains and movement.

4.2 *Interactions of Movement with Counterexamples to Baltin's Generalization*

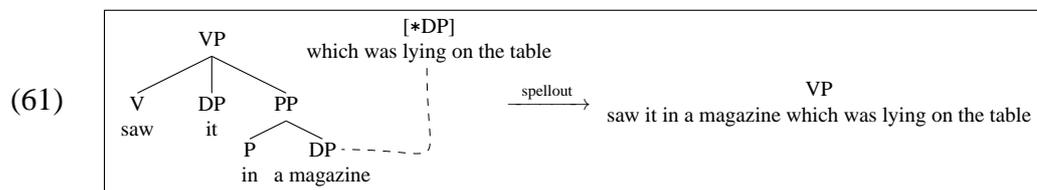
Baltin (1978:82) notes a curious contrast in cases where the host of an extraposed element is the complement of a PP (rather than a subject or direct object): extraposition from these phrases is generally acceptable, as shown in (60a), but unacceptable if the PP undergoes wh-movement, as shown in (60b).

- (60) a. I saw it in a magazine yesterday [which was lying on the table].
 b. * In which magazine did you see it yesterday [which was lying on the table]?

The relative clause in (60a) appears at the right edge of (at least) VP. This is unexpected: both Baltin's original generalization and the account we have presented would predict that it should be linearized at the right edge of the PP that contains the host phrase.

The unacceptability of (60b) is therefore exactly as predicted, but leaving the PP in situ somehow relaxes the constraint. (This also seems to hold in German: see note 24.)

A derivation of (60a) requires somehow collapsing the extra domains of locality introduced by the presence of the PP. Following this line of thought, suppose we simply add a stipulation that achieves the desired effect: by some process roughly along the lines of “reanalysis”, the PP and the VP that we would otherwise assume each constitute their own domain of locality instead are somehow able to collapse into one.²⁵ Whatever the details of this process might be, it turns out that under our account it will be possible only when the PP remains in situ. In the derivation of (60a), the VP phase will proceed along the lines of something like (61), where, in virtue of the collapsed domains of locality, the relative clause that modifies *a magazine* can appear at the right edge of the VP because this target of modification is in effect just as local to the VP as a normal object is. (To reduce clutter we abstract away from the adverb *yesterday*, which appears in (60a) just to ensure that the relative clause is indeed extraposed.)



But whatever underlies this collapsing of locality domains, (60b) will still be correctly ruled out: it will not be possible to allow the relative clause to be introduced during the VP phase, as it is in (61), and in the same derivation front the PP. The reason is that in order for the PP to be moved in (60b), there *must* be some application of spell-out which produces exactly the string *in which magazine*. So this option of “skipping” a spellout step must be foregone if the fronting is to occur, and so the constituents of the PP, such as the would-be target *which magazine*, will not remain visible in the VP phase. The necessity of applying spellout to the PP alone brings us back, in effect, to the original situation where “every phrase counts”.

A similar modification to the relevant domains of locality, and the interaction of such modifications with movement operations, turns out to neatly explain an interest-

ing collection of German facts which Wurmbrand and Bobaljik (2005:683–684) call Haider’s Puzzle. Extraposition of the relative clause in (62) must place it all the way to the right of the finite verb *hat*, rather than only to the right edge of the infinitival verb phrase headed by the participle *gegeben* (or any other verbal projection below the finite *hat*²⁶) as shown by (63); but this placement at the right edge of the infinitival becomes possible if the infinitival undergoes movement, as shown in (64).

(62) daß er jenen etwas gegeben hat [die ihn darum gebeten haben]
 that he those something given has who him for-it asked have
 ‘that he gave something to those who asked him for it’

(63) * daß er jenen etwas gegeben [die ihn darum gebeten haben] hat

(64) [jenen etwas gegeben [die ihn darum gebeten haben]] hat er noch nie
 those something given who him for-it asked have has he yet never
 ‘He has never yet given something to those who asked him for it’

These judgements for (62) and (63) are unexpected: our expectation from Baltin’s Generalization would be that it should be possible to extrapose the relative clause to the edge of the phase headed by *gegeben*, and no further, which is precisely the opposite of what we observe. (Note that this is somewhat reminiscent of the problematic (59).)

Suppose again that, in order to make the correct predictions about (62) and (63), we simply add a stipulation that collapses the two relevant phases into one: hence (63) is impossible because the relative clause is not placed at the edge of any phase, and (62) is the natural result of extraposing it. Just as the stipulation tailored to account for (60a) turned out to go on to correctly predict the unacceptability of (60b), this stipulation motivated solely by (62) and (63) correctly predicts the possibility of (64) (which appears to conflict, recall, with the impossibility of (63)). The reason is that in order to derive (64), spellout *must* apply to the infinitival itself since this is the constituent that is fronted. Hence this constituent, which by stipulation we allowed to *not* constitute a bounding node to derive (62) and (63), *does* act as a bounding node in (64), and so the

familiar one-phase-up pattern re-emerges, as it did in (60b).²⁷

4.3 *Extraposition of complements*

As mentioned at the outset, our account applies only to extraposed adjuncts. There are cases that have also been grouped under the extraposition label which look superficially similar to the ones we have considered, involving complements rather than adjuncts appearing at the far right of a sentence; see (65), for example.

- (65) a. A claim emerged [that the senator was corrupt]
b. John bought some pictures yesterday [of beautiful mountain scenery]

To the extent that these examples exhibit the patterns of behavior that we have addressed in this paper, our account would become less attractive, since it applies specifically to adjuncts and not complements. But in at least some cases, the construction in (65) does not follow the generalizations from section 1 that we have focussed on.

First, we should be clear about what we take to be complements of NPs. We will take the *one*-substitution test as diagnostic: a complement of an NP must be obligatorily included in the constituent replaced by *one*, whereas an adjunct may or may not be. The relevant phrases in (65) are therefore complements on the basis of (66).

- (66) a. * A claim that the senator was corrupt emerged, and one that everyone was clean was ignored
b. * John bought a picture of beautiful mountain scenery, and Mary bought one of ugly polluted waterways

Adjoined phrases of the sort we have addressed in this paper behave differently under this test (compare with (1)).

- (67) a. John bought a book about the price of tea in China, and Mary bought one about something else
b. I called somebody who I couldn't stand, and Mary called somebody who she adores

We choose this as our relevant diagnostic because this is the contrast that underlies Hunter's (2010) implementation of adjunction, which we aim to extend.

The basic pattern that prompted Baltin's original generalization *does* seem to extend from the adjunct cases to these cases of displaced complements: the complements of subjects are necessarily stranded by VP-fronting, whereas complements of objects are necessarily included, as shown in (68) and (69) respectively.

- (68) a. * Emerge [that the senator was corrupt] though a claim did, ...
b. Emerge though a claim did [that the senator was corrupt], ...
- (69) a. Buy some pictures yesterday [of beautiful mountains] though he did, ...
b. * Buy some pictures yesterday though he did [of beautiful mountains], ...

This pattern does not seem to extend to co-occurring subject-hosted and object-hosted elements in the way we discussed for adjuncts, however. Recall from (39) that in the case of adjuncts, such co-occurrence is possible, subject to an ordering constraint; with complements, however, we find neither order to be as acceptable as (39a).²⁸

- (70) a. * Some incriminating pictures showed claims to be false [that the defendant was innocent] [of the murder weapon]
b. * Some incriminating pictures showed claims to be false [of the murder weapon] [that the defendant was innocent]

The relevance of this data is arguably called into question by the fact that the rightwards displacement of the subject's complement is not obviously acceptable in and of itself. This sort of configuration seems to be quite sensitive to the presence of an object.

- (71) a. * On Tuesday, every incriminating picture surprised us [of the murder weapon]
b. On Tuesday, every incriminating picture emerged [of the murder weapon]

But this sensitivity to the presence of an object might itself give us reason to doubt that complements and adjuncts are extraposed by the same mechanisms, because it does not hold for adjuncts: both of the following are acceptable.²⁹

- (72) a. On Tuesday, every incriminating picture surprised us [which showed the murder weapon]
- b. On Tuesday, every incriminating picture emerged [which showed the murder weapon]

Recall also the complement/adjunct contrasts we observed in the discussion of anti-reconstruction effects earlier, in (44), (45) and (46): the independently-observed contrast between relative clauses and complement clauses is carried over to cases of extraposition, even those licensed by in-situ hosts.

Whatever the underlying source of surface strings with complement clauses in non-canonical positions at the right edge of sentences, it appears to be different from the source underlying the analogous cases with adjuncts.

4.4 *Vacated positions as hosts*

We have seen that when a host phrase moves, an extraposed adjunct can appear in a high position licensed by the host's post-movement position: recall again the sentence-final position for the object-modifying relative clause in (40b), for example.

- (39) a. Someone picked some books up [which were lying on the table] [who really didn't want to].
- b. * Someone picked some books up [who really didn't want to] [which were lying on the table].
- (40) a. ? Which books did someone pick up [which were on the table] [who didn't really want to]?
- b. Which books did someone pick up [who didn't really want to] [which were on the table]?

We have thus far left open, however, the question of whether this higher attachment is the *only* option for extraposed elements with moved hosts, or whether it is also possible for extraposed elements to attach in a position corresponding to the host's base position.

Our theory makes no relevant distinction between pre-movement and post-movement positions, so at present there is nothing ruling out hosting by vacated positions; but if this turns out to be empirically problematic, a stipulation prohibiting it could be added easily enough (without altering the desirable predictions discussed so far).

To the extent that (40b) is better than (40a), this would lead towards the conclusion that extraposed elements with a moved host *must* attach according to the host's post-movement position in order to be fully grammatical, disallowing the VP position in the case of a wh-moved object; but the status of (40a) is relatively unclear. Certainly (40a) seems more acceptable than other illicit orderings such as (39b).

Note, however, that while we have abstracted away from VP-internal subject positions for much of this paper, when we say that a subject-hosted adjunct appears at the right edge of IP, this is based on a post-movement position. The question then arises: can an extraposed subject-hosted adjunct appear somewhere lower, in virtue of the subject's VP-internal position? If we assume that both subject and object originate in the core VP projection, then (39) suggests that this low attachment is *not* possible: if it were, then we would expect it to be possible for both of the two relative clauses in (39) to be linearized at the right edge of VP, which would make either order possible. If we assume, on the other hand, that the subject's base position is in a distinct *v*P projection, then the facts are consistent with the idea that attachment to base positions is allowed: while there might be ambiguity in (39a) whether the subject-hosted relative clause is at the right edge of *v*P or IP, neither option would allow the object-hosted relative clause to appear further to the right.

Guéron (1980:644) presents the contrasts in (73) and (74) as evidence that positions out of which hosts move can *not* license extraposed elements.

- (73) a. A book was believed [to be on the table] by all of us [which was written by William Shawcross]
- b. * A book was believed [to be on the table [which was written by William

Shawcross]] by all of us

- (74) a. Many people seemed [to be hard to get along with] to other members of the department [who had at first made a good impression]
- b. * Many people seemed [to be hard to get along with [who had at first made a good impression]] to other members of the department

In each of these cases the matrix subject originates inside the embedded non-finite clause, but an extraposed relative clause modifying this subject must appear at the right edge of the matrix clause, not at the right edge of this non-finite clause. The contrasts here are clear, so it is tempting to take this as conclusive evidence that vacated base positions do not license extraposed adjuncts.

This leaves us with the question of why the contrast in (40) is not nearly as clear. One response to this would be to hypothesize that the difference stems from the distinction between A-movement and A-bar-movement: Guéron's clear cases involve A-movement, whereas the more questionable (40) involves A-bar-movement. Perhaps A-bar traces license extraposition but A traces do not. If this is correct, then the possibility discussed above of subject-hosted extraposed elements appearing somewhere lower than IP would be ruled out: since the relevant movement would be A-movement, the vacated thematic position of a subject would not be able to license extraposition, and so the contrast in (39) would remain equally consistent with subjects originating inside VP or inside a distinct *v*P.

5 Conclusion

We have argued that a natural account of adjunct extraposition emerges from an independently proposed implementation of the syntax and semantics of adjunction. A central idea from the framework we adopt is that an adjunct semantically modifying a particular XP need not be present in the derivation while the internals of XP (the X head, and its complement and specifiers) are being assembled; because of the undemanding nature of the directly conjunctive semantic composition of an adjunct with its host, it

suffices for the adjunct to be introduced at some later stage of the derivation where the target XP is acting as a complement or specifier of some other projection. This predicts exactly the pattern of locality restrictions that have been independently observed for extraposition, thus unifying this phenomenon with the other facts concerning constituency and anti-reconstruction of adjuncts that the framework was originally intended to account for. Our analysis also improves on previous non-movement accounts of extraposition that have addressed its syntactic constraints but left open the question of just how the appropriate semantic modification “at a distance” takes place, by tying the syntactic locality effects directly to a particular mechanism of semantic composition.

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Notes

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¹We assume that relative clauses are adjuncts, but leave aside many other details of their syntax and semantics. In particular we remain agnostic, as far as possible, about the question of whether the “head” originates inside a relative clause or not; although we note that implementations of head-internal or “promotion” analyses (e.g. Kayne 1994) often do not assume that relative clauses involve adjunction.

²We assume that the choice is restricted to maximal projections: in modern terms, what Baltin called S corresponds to the maximal projection TP/IP and what Baltin called S' corresponds to CP.

³While one could consider positing distinct extraposition transformations, each with its own target position — extraposition-from-subject adjoins to IP, extraposition-from-object adjoins to VP, etc. — the generalization would then be missed, and Generalized Subjacency itself would no longer be necessary.

⁴For Guéron (1980) and Guéron and May (1984), extraposition still involves (overt) rightward movement of the adjunct out of its canonical position, but the required locality between the host and this adjunct is achieved at LF when the host covertly undergoes QR, to a position of similar “height”.

⁵Hence the composed semantic values are not “disturbed” by the fronting of *meet Mary* at all. For other instances of movement that are not semantically vacuous, the idea we introduce here to implement the phonological effects of movement can be extended to similarly manipulate semantic values: in the case of quantificational variable-binding, for example, an early application of spellout can produce a semantic interpretation that includes the appropriate variable, and leave “detached” a semantically non-null quantifying element that reemerges later to bind it. Following Kobele (2006, 2010), the effect is reminiscent of Cooper Storage (Cooper 1983). See Hunter (2010,

submitted) for details. But for the purposes of this paper, it is easiest to abstract away from semantic effects of movement.

⁶The formal details are based on the observation by Michaelis (2001) that minimalist grammars, as formalized by Stabler (1997), can be construed as *multiple context-free grammars* (MCFGs) (Seki et al. 1991). In simple cases like (15), the idea of a single “constituent” having separable pieces is reminiscent of the wrapping operation in categorial grammars (Bach 1979, 1984): *meet Mary* and *Bill said John must* wrap around the (phonologically null) C head. MCFGs are a generalization of the same intuition.

⁷It is possible, of course, to ignore the semantic motivation we present and to simply take our implementation of adjunction as a purely syntactic proposal. Readers who disagree with the use of event variables, say, might still in principle adopt the syntactic machinery we present here and supplement it with other semantic assumptions that they prefer. We hope, however, that the semantic perspective we adopt might nonetheless provide useful intuitions for understanding the syntax itself, even if some readers may want to “kick away the ladder” once all the details have been presented. From section 2.3 onwards, very little reference will be made to the semantics.

⁸Slightly more precisely: two constituents will be connected by an adjunction relationship if their semantic values are composed by simple predicate conjunction, without additional help.

⁹Given this assumption, there is always exactly one free variable in any semantic value we will write down; they are open sentences. Readers may prefer to think of these free variables as being lambda-bound, such that the semantic value of *bought* for example would be written as ‘ $\lambda e.$ **bought**(e)’ rather than ‘**bought**(e)’. This is harmless as long as it is remembered that semantic composition does not proceed by *applying* the functions thus denoted. Alternatively, one can think of the unique free variable in each semantic value being replaced by a distinguished symbol ‘_’, distinct from any of the symbols used for *bound* variables (e.g. **bought**(_) $\wedge \exists x$ [**books**(x) \wedge Theme(, x)]).

¹⁰Note that the question of what something *modifies* is a relatively theory-neutral one,

in that we can, with relatively meagre assumptions, make observations about what an adverb or adjective modifies: in (20) *about syntax* modifies *books*, and in (21) *yesterday* modifies either *bought* or *boughts books*. Asking what something *adjoins to*, on the other hand, is a question about a particular theoretical analysis, not one that can be answered by observation, and only makes sense given a theory that defines the term “adjoin to”. The framework we are adopting here aims to account for the facts about what modifies what, without any theoretical construct that corresponds directly to what is called “adjoin/adjunction” in other theories. So while one can never say that, in a particular derivation in this framework, such-and-such adjoins to such-and-such, there are no *empirical facts* of this form that are out of reach as a result.

¹¹This is similar to the way an adverb would be assigned category $VP \setminus VP$ or an adjective would be assigned category NP/NP in many categorial grammars. The alternative is to use fresh symbols such as *Adv* and *Adj* for adverbs and adjectives, and to state separately that adverbs combine with VPs to form VPs and that adjectives combine with NPs to form NPs.

¹²The fact that some elements are never merged obviously requires that the definition of *c-command* (or whatever relation one takes to be responsible for scope-like facts) should be stated not in terms of what *merges* with what, but rather in terms of what *composes* with what, in the more general sense according to which *yesterday* does compose with the rest of the VP in (26). Since this involves appealing to semantic and phonological composition, it may amount to treating scope-related phenomena “in the semantics”.

¹³Note that no information is lost if this dashed line is omitted. The “matching” of [**DP*] with the DP label is all that formally matters, and the dashed line indicates only this. In principle, this approach therefore allows cases where an adjunct is introduced which matches two distinct candidate hosts — say, the complement and the specifier of the current phase — and so the derivation does not uniquely determine what this adjunct should semantically modify. One response to this would be to simply leave

the resulting semantics underspecified (in the same way that our linearization algorithm already leaves the relative ordering of certain adjuncts underspecified); another would be to disallow adjunction in such ambiguous cases. We leave this question open here.

¹⁴A consequence of this view is that extraposition is not a matter of adjuncts appearing further *to the right*, per se, of their canonical positions, but rather a matter of adjuncts appearing further “outwards” than their canonical positions. There is no problem assuming that each adjunct has just a single left/right directionality specification that is used in both non-extrapolated and extrapolated cases, because right adjuncts cannot be extrapolated to the left (Baltin 1978:21–23), nor can left adjuncts be extrapolated to the right. An additional option our approach leaves open is that it might be possible to extrapolate left adjuncts to the left. If this possibility is borne out, it would follow naturally from our theory; if it is not, then it would appear to be a brute fact that extraposition only applies to right adjuncts, and every theory would likely be forced to simply stipulate something to this effect.

Others have likewise proposed that extraposition is not a matter of *attaching differently* but merely a matter of *attaching higher*, such as Wiltschko (1997) and Koster (2000). In these previous accounts, however, the common mechanism of attachment that is invoked for both extrapolated and non-extrapolated modifiers places them consistently on the right; this contrasts with our mechanism of attachment which can place a modifier on either side, depending on the properties of the modifier itself. As these analyses do not provide an account for the canonical placement of left adjuncts (e.g. adjectives in English), it is hard to know what they would predict about such adjuncts’ extraposition possibilities.

¹⁵In fact, at the point (not shown in (27)) in the derivation where *books* has been inserted into the derivational workspace but not yet merged, it is in the same “disconnected” state that *yesterday* remains in until the end of the phase. See Hunter (2010, submitted) for details.

¹⁶One might wonder whether, instead of being freely ordered, the two adjuncts’ linear

positions should be dictated by the XPs they modify. The idea here would be that just as **about-syntax**(*x*) is interpreted, in effect, as part of the complement of the verb for semantic purposes, it should likewise be linearized “as part of” the complement. This would produce only the non-extrapolated word order, and is the only option used by Hunter (2010). We will use a version of this idea below.

¹⁷There is actually nothing preventing spellout from *applying* to the syntactic expression in (30b), but the effect of applying spellout here will not be to conjoin the meaning of *about syntax* with that of *books* (since the meaning of *books* itself is not in play at all). In the particular case of (30b) spellout would perhaps conjoin *about syntax* with *John*, the latter being a DP; we take no position on this. The point, however, is that if, when spellout applies, an adjunct is present in the workspace but there is no unit in the tree structure that appropriately matches its [*XP] annotation, then the adjunct simply remains in the workspace, unaffected by spellout. See Hunter (2010) for details.

¹⁸We must assume that relative clauses (as well as PPs like *about syntax* from earlier) adjoin at the DP level. While the more straightforward approach would be to assume that it modifies NP, Bach and Cooper (1978) argue for an analysis where relative clauses modify at the level of DP by contributing a kind of domain restriction for the quantification induced by the determiner. Another possibility would be to adopt a distinction between “local” semantic composition and “scope-taking” semantic composition (along the lines of, for example, Barker and Shan (2008)), such that the DP phase adds a scope-taking element to the constructed semantic value without closing off the predicate denoted by its complement NP.

¹⁹The contrast between (8) and (36) is problematic on at least a straightforward understanding of Baltin’s generalization, but could most likely be accommodated by Culicover and Rochemont’s (1990) account. They restrict attention to the dependency between a head noun and its complements and adjuncts, but if their version of government is also taken to mediate the relationship between a VP and its adjuncts then the pattern in (36) would follow from their analysis in essentially the same way that it does from

ours, with the VP-modifier in an “extraposed” position in TP.

²⁰We return to the comparison between (40b) and (40a) in section 4.4.

²¹Rochemont and Culicover (1997) mention (crediting Bob Levine) that this is reminiscent of Lebeaux’s examples, but do not give a unified account.

²²Two subtleties are worth mentioning here. First, (45) raises a small complication, which we are grateful to Klaus Abels for pointing out. Assuming that the derivation that allows (45b) involves introducing *yesterday* and the relative clause during the same phase, then another possible ordering of these two adjuncts when spellout ends that phase should be the one in (45a). This would lead us to predict that there is a second derivation of (45a) which should not induce the Condition C effect. To avoid this erroneous prediction, we must somehow rule out such “string-vacuous extraposition”. This can be achieved by requiring that late-attaching adjuncts (i.e. adjuncts modifying the complement or specifier of the current phase) are linearized outside any adjuncts modifying the head of the current phase. In other words, instead of the two options illustrated in (28) and (29), only the latter would be allowed. Of course, the non-extraposed *bought books about syntax yesterday* word order there can still be achieved by introducing *about syntax* inside the DP; this change just means that *if* the derivational option of late-insertion is taken, then this must be reflected in the eventual word order.

Second, a sentence analogous to (45b) is marked with a star by Büring and Hartmann (1997:64), in order to indicate a contrast between the extraposed object-modifier (*that supports John’s theory*) and an extraposed subject-modifier. Their examples do not form a minimal pair, however, and our judgements of the relevant minimally-differing examples, e.g. (45b) vs. *An argument occurred to him_i yesterday that supports John_i’s theory*, are that there is not a clear contrast. (Büring and Hartmann also report the corresponding contrast in German; see (56) and note 23 below.) It is possible, perhaps, that some English speakers will find a three-way distinction, with the extraposed subject-modifier examples judged better than (45b), and (45b) nonetheless better than (45a), in which case we claim only to account for the latter of the two pair-wise contrasts.

²³The fact that the object-modifying adjunct in (56a) is not rescued from the Condition C effect by extraposition is inconsistent, it seems at first, with the English contrast in (45) from Fox and Nissenbaum, which compares an extraposed adjunct with a non-extraposed one (though see also note 22). We must assume that while the indirect object *ihr* in (56) is (for purposes of Condition C) in a higher phase than the direct object, the indirect object *him* in (45) is in the same phase as the direct object. The configuration we must assume for German appears to be supported for Dutch: de Vries (2002:262) reports no improvement in Dutch for the comparison directly analogous to Fox and Nissenbaum's (45).

- (75) a. *Ik heb hem_i een vrouw aanbevolen [die Joop_i niet kende]
 I have him a woman recommended who Joop not knew
 'I have recommended to him a woman who Joop did not know'
- b. *Ik heb hem_i een vrouw [die Joop_i niet kende] aanbevolen

(We assume that no meaningful comparison can be made between Buring and Hartmann's ?? and de Vries's *; we take the facts to be just that there is a contrast in (56) but no contrast in (75).)

²⁴The following example, judged acceptable by a reviewer, conflicts with Baltin's Generalization in a way that seems analogous to (57). Here the object, rather than the subject, has been fronted.

- (76) Die Frau dieses/jenes Boten hat man beschimpft der den Befehl überbrachte

Other speakers, however, found this worse than (57). This contrast may be a result of the interaction between extraposition and movement of the host that we discuss below in section 4.2. Indeed, the speakers who judged (76) worse than (57) report that the English contrast in (60) carries over to German.

²⁵Wiltschko (1997:393, n.12) also notes, without any explanation, that PPs seem to be transparent for the relevant locality measure in German.

²⁶It might be necessary, for compatibility with the assumptions we made earlier about

the position of *ihr* in (56), to take the host *jenen* to be in a projection higher than that of *gegeben* itself. All that matters for the present argument is that there is some projection that contains *jenen etwas gegeben*, but not *hat*, and which is fronted in (64).

²⁷Our proposal here is similar to that of Truckenbrodt (1995), for whom “phonological phrases” play a role similar to that played by phases for us.

²⁸Although a reviewer finds examples like (70a) better than those with the reverse order such as (70b). Since we do not propose an account of complement extraposition, we leave this issue unresolved.

²⁹The intended reading here, to avoid the potential confound of appositive/non-restrictive readings that are not available for complements, is the restrictive relative clause reading. The universal quantifier helps to bring out this distinction. Thanks to an anonymous reviewer for drawing our attention to this point.