

Complement and Adverbial PPs: Implications for Clause Structure

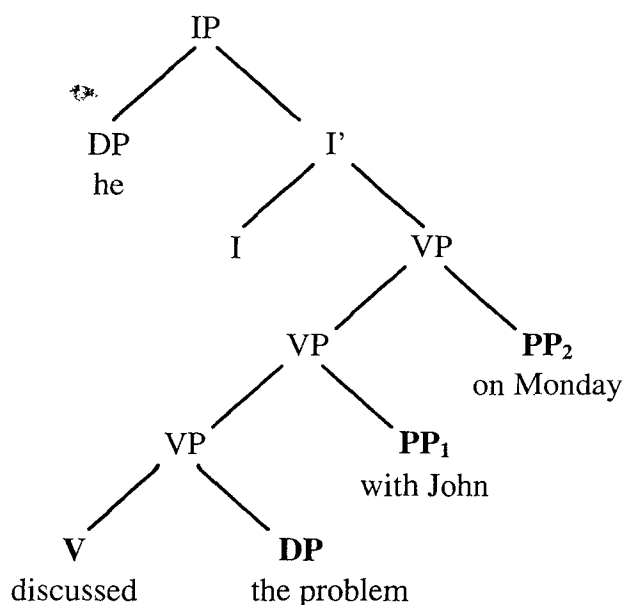
1. Introduction

In what follows I will consider certain aspects of the syntax of prepositional phrases. In particular I will discuss some evidence from my own work and from that of Schweikert (2004) that suggests that PPs, despite appearances, are rigidly ordered among each other, this order being concealed in certain cases by the application of focus sensitive movements.¹

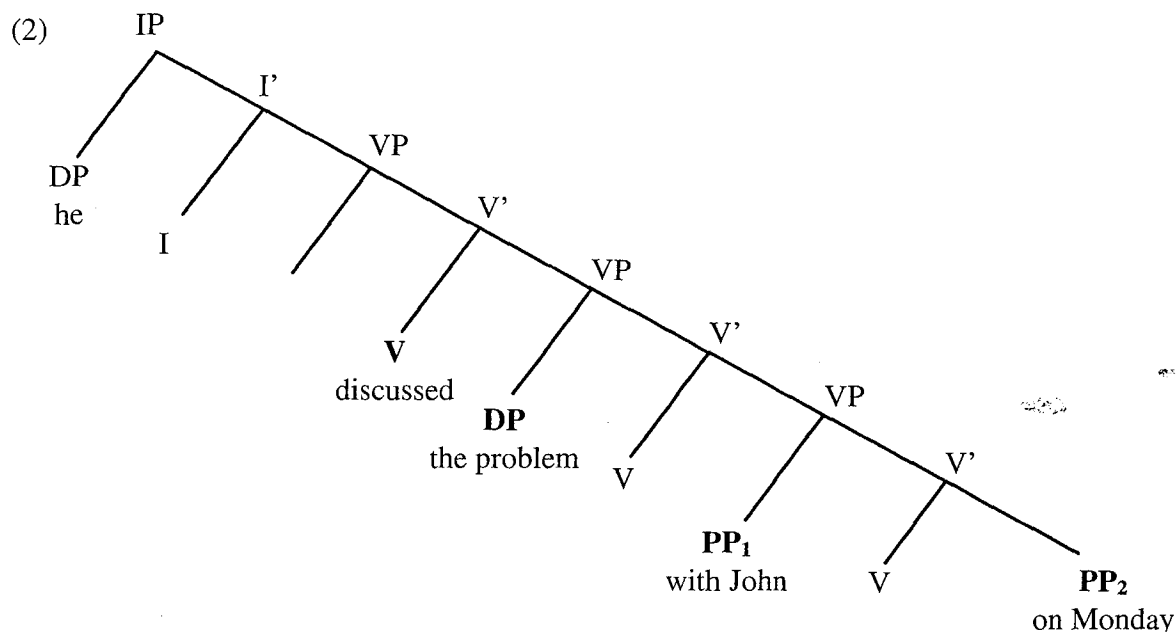
Although the order of PPs in *postverbal* position (typical of VO languages) is in general the mirror image of the order of the same PPs in *preverbal* position (typical of OV languages), their relative height (and scope) turns out to be the same, a property that I will take to suggest a universal order of merge of the different PP types.

If we start by asking what structure postverbal PPs enter in a VO language like English we immediately run into a curious paradox (Pesetsky 1995). Some of their properties would seem to favor the traditional, pre-antisymmetry, analysis of Chomsky (1981), according to which the PPs are right-adjoined to VP (those on the right being higher than and c-commanding those on the left):

(1)



Other properties would instead seem to favor a Larsonian structure, in which a PP on the left is higher than and c-commands the PPs to its right:²



Among the phenomena that apparently favor the left-branching structure (1) are:

A. *Lack of Principle C effects*. The direct object can be coreferential with an R-expression contained in an adverbial PP to its right. Cf. (3):³

- (3) a. They killed him_k [on the very same day John_k was being released from prison]
 b. They hit him_k [without John_k being able to defend himself]

This is expected under (1), where the object does not c-command the PP (at least under a definition of c-command that makes reference to “first branching node,” as in Reinhart 1983), but not under (2), where the object necessarily c-commands all of the PPs to its right.⁴

B. *Constituency diagnostics*. If movement is a reliable constituency test, as standardly assumed (Pesetsky 1996),⁵ then the VP-Preposing cases in (4) provide evidence that the V and its object ([4a]), the V, the object, and the first PP ([4b]), the V, the object, and the two PPs ([4c]), are all constituents (see Pesetsky 1995: 227ff and Nilsen 2000: chapter 3). Conversely, the ungrammaticality of (5a–b) seems to suggest that neither the two PPs alone ([5a]) nor the object plus the two PPs ([5b]), are constituents (although, in principle, some factor other than lack of constituency might be responsible for the impossibility of their fronting). All this is expected under (1) but not under (2), where the two PPs and the object plus the two PPs are constituents, while neither the verb and the object nor the verb, the object, and the first PP are:

- (4) He promised he would discuss the problem with John on Monday . . .
 a. . . . and [discuss the problem] he did with John on Monday
 b. . . . and [discuss the problem with John] he did on Monday
 c. . . . and [discuss the problem with John on Monday] he did

- (5) a. *It's [with John on Monday] that he discussed the problem
 b. *It's [the problem with John on Monday] that he discussed

C. *Relative scope of VP-final PPs.* In postverbal position, PPs on the right typically take scope over the PPs to their left. See (6) (see Aoun and Li 1993: 160, Manzini 1995, Pesetsky 1995: 233, and Ernst 2002):⁶

- (6) a. John didn't smoke in the car because of the rain
 b. Mary has been in the hospital for over a month
 c. John depends on royalties for his livelihood

Under the usual assumption that scope is structurally coded in terms of c-command, this is expected under (1) but not under (2), where a PP to the right is c-commanded by (is under the scope of) every PP to its left.⁷

In spite of this evidence for structure (1), other phenomena exist that appear to go in the opposite direction, favoring (2) over (1), among them the binding of anaphors ([7]), the binding of pronouns (by quantifiers) ([8]), and the licensing of negative polarity items ([9]):

A'. *Anaphor binding.*

- (7) a. John spoke to Mary about *these people* in *each other's* houses on Tuesday (Pesetsky 1995: 172)
 b. *John spoke to Mary about *each other* in *these people's* houses on Tuesday

B'. *Pronominal binding (by a quantifier).*

- (8) a. Gidon Kremer performed in *every Baltic republic* on *its* independence day (Pesetsky 1995: 161)
 b. *He used to spend many hours in *its* memorial on *every independence day*

C'. *Licensing of Negative Polarity Items (NPIs).*

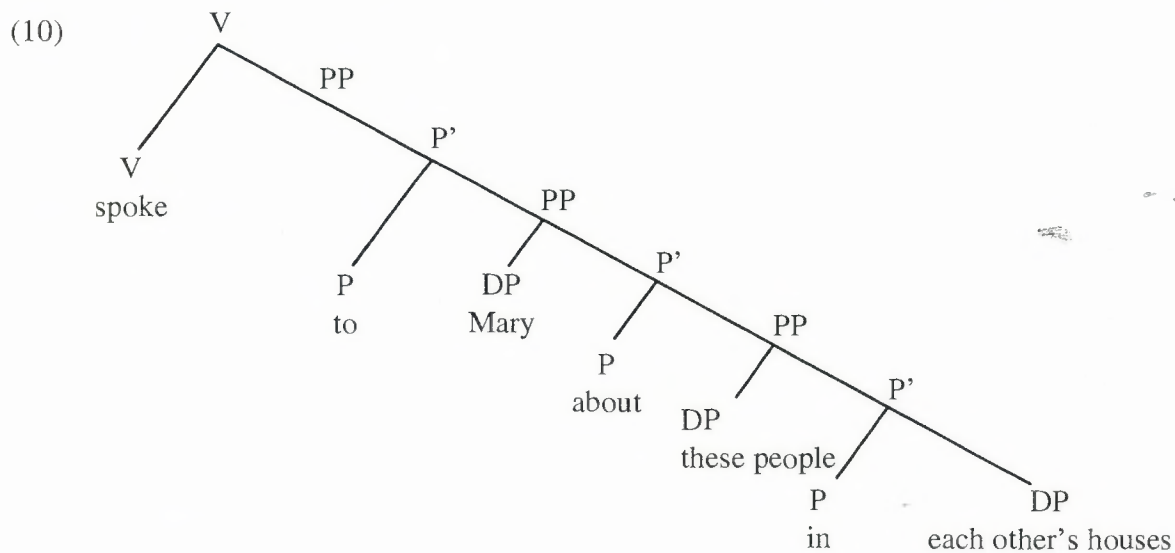
- (9) a. John spoke to Mary about *no linguist* in *any conference room* (Pesetsky 1995: 162)
 b. *John spoke to Mary about *any linguist* in *no conference room*

Under the standard assumption that anaphor binding, pronominal binding, and NPI licensing require the binder to c-command the bindee, the contrasts in (7)/(8)/(9) are expected under (2) but not under (1).

We thus seem to have reached a paradox. Properties (A)–(C) provide evidence for (1) and against (2); properties (A')–(C') provide evidence for (2) and against (1).

Adding further to the paradox is Pesetsky's (1995: 172ff) observation that the objects of the PPs in (7)/(8)/(9) unexpectedly appear to c-command *out of* the PPs.

Pesetsky's own solution to the paradox (and to the c-command puzzle) was to assign sentences with adverbial PPs two parallel structures: one like (1) (which he called layered structure), which was meant to account for the first set of phenomena; and one similar to (2) (except that the Ps are heads on the main projection line and do not form a constituent with their "objects"—what he called cascade structure—cf. ([10]), which was meant to account for the second set of phenomena:



Sharing with him the idea that neither set of phenomena can be easily disposed of as spurious, I would like to propose a "serial" rather than "parallel" solution to the paradox, one that may capture the two sets of phenomena at different levels of one and the same derivation.

As a preliminary to that, I will take up the question of what is the order of merge of (complement and adverbial) PPs.

2. On the order of merge of complement and adverbial PPs

Based in part on facts like those in (11) and (12), complement and adverbial PPs are often assumed not to enter the derivation in a strict order (see, for example, Jackendoff 1990: fn. 2, Cinque 1999: 28ff, and Ernst 2002: sect. 6.4):⁸

(11) a. John talked to Mary about Bill

b. John talked about Bill to Mary

(12) a. I met John in the park on Friday

b. I met John on Friday in the park

Baker's (1988) Uniformity of Theta Assignment Hypothesis (UTAH) should make this assumption suspicious for complement PPs, which uncontroversially bear a theta-role, but perhaps also for circumstantial PPs, if they, too, bear a theta-role (see Frawley

1992: chap. 5 on participant, or argumental, and nonparticipant, or circumstantial, theta-roles).⁹

Apart from this conceptual consideration, empirical evidence exists that complement and adverbial PPs are merged in a rigid hierarchical order.

One first clue comes from the fact that, under certain circumstances, the apparently free ordering of PPs seen in (11) and (12) disappears, leaving a clear asymmetry between the two orders.

2.1. Evidence against free ordering of complement and adverbial PPs

2.1.1. *Asymmetry in idioms*

Belletti and Shlonsky (1995: 495f) observe that in double complement idioms of the form V NP PP, if both the NP and the PP contribute to it, the idiomatic reading is only available with the order NP PP (and is lost with the opposite order). See, for example, (13) (adapted from their [14]):

- (13) a. Lui mette sempre i puntini sulle 'i'
He always puts the dots on top of the *i*'s
'He is always meticulously precise'
- b. %Lui mette sempre sulle 'i' i puntini
he always puts on top of the *i*'s the dots
(*He is always meticulously precise')

If we consider the case of double PP idioms, we find exactly the same situation. The idiomatic reading is possible in one of the two orders of the PPs only. With the other it is lost. See (14) (where the idiomatic reading is only possible with the order Subject Matter¹⁰ PP > Locative PP):

- (14) a. Gianni parla sempre *di corda in casa dell'impiccato*
G. always talks about rope in the house of the hanged man ('G. always makes blunders')
- b. %Gianni parla sempre *in casa dell'impiccato di corda*
G. always talks about rope in the house of the hanged man (*G. always makes blunders')

2.1.2. *Asymmetry in phonological reduction*

Another asymmetry, cited by Larson (1990: 608) and Pesetsky (1995: 255), who attribute the original observation to John Frampton, concerns the possibility of phonologically reducing the pronominal object of a preposition in the second of two PPs. With Goal and Subject Matter PPs, such phonological reduction is only possible with the order Goal PP > Subject Matter PP. See the contrast between (15a) and (b):

- (15) a. John talked to Mary about 'm
b.*John talked about Mary to 'm

This asymmetry appears related to the preceding one (and to Larson's observation mentioned in note 8). What ties (11), (14), and (15) together is the fact, we suggest, that only one of the two orders is the "canonical" one (*to* DP > *about* DP; and *di* 'about' DP > *in* DP), the other being derived through an additional focus sensitive operation that has the contrastively focalized PP (the *to* PP in [11b], [15b], and the *di* PP in [14b]) end up to the right of the other PP. After Kayne (1994) we take the movement of the focalized PP not to be directly to the right but rather to the left, into the Spec of a (possibly low) FocusP (see Jayaseelan 1990 and Belletti 2001, 2004a), followed by leftward movement of the remnant (see Nilsen 2000: 72). We exemplify this with the derivation of (11 b) (which may also provide an account for Larson's judgment mentioned in note 8):

- (16) a. . . . talked to Mary about Bill →
 b. . . . [_{FocP} to Mary F [_{VP} talked t about Bill]] →
 c. . . . [_{XP} [_{VP} talked t about Bill] X [_{FocP} to Mary [t]]

When, for independent reasons, a phrase cannot move into Spec,FocusP, either because, being part of an idiom, it cannot be contrasted (as in [14])¹¹ or because it is phonologically weak, hence again noncontrastable (as in [15]), the result is ungrammatical.

We take the next two asymmetries also involving *to* DP *about* DP to be again a consequence of the fact that only *to* DP *about* DP is the canonical order, deferring until later the discussion of how exactly the two contrasts can be made to follow. (It is interesting that all the asymmetries consistently single out the *to* DP *about* DP order as the nonspecial one.)

2.1.3. *Asymmetry in anaphor binding possibilities*

Considering such examples as (17a) and (b), Chomsky (1981: 225, fn. 37)¹² notes that while the "order of the two PPs is free, with a preference for the *to*-phrase preceding, [. . .] only in [(17)a] can the NP of the first PP be the antecedent of the anaphor."¹³

- (17) a. John talked to the men about each other
 b.*John talked about the men to each other

2.1.4. *Asymmetries in preposition stranding*

Hornstein and Weinberg (1981: 71) observe a similar contrast between the two orders concerning preposition stranding possibilities. See (18a)–(19b):

- (18) a. Who_i did John talk to t_i about Harry yesterday?
 b.??Who_i did John talk about t_i to Harry yesterday?
 (19) a. Who_i did John talk to Harry about t_i yesterday?
 b.??Who_i did John talk about Harry to t_i yesterday

2.1.5. Asymmetries with adverbial PP pro-forms

Another circumstance in which the rigid ordering of PPs reappears is with certain adverbial PP pro-forms, in certain languages. As Nilsen (2000: 72f) notes for Norwegian, a Temporal PP, in the unmarked case, follows a Locative PP, although the other order is also possible if the Locative PP is focalized. See his examples (16a–b), given here as (20a–b) (following him, as earlier, we take [20a] to be the canonical order and [20b] to be derived by movement of the Locative PP into Spec,FocusP followed by remnant movement). When the corresponding pro-forms are used, however, only the canonical order V LocPP TempPP is possible. See his examples (19a–b), given here as (20c–d).¹⁴

- (20) a. Jeg møtte ham i parken på fredag
I met him in the park on Friday
- b. Jeg møtte ham på fredag I PARKEN/*i parken
- c. Jeg møtte ham **der da**
I met him there then
- d. *Jeg møtte ham **da der**

As observed in Frey (2000: 113), German displays a similar rigidity with wh-adverbial pro-forms used as indefinites, though the German order (TempPP > LocPP) is the mirror image of the Norwegian one, a point we return to later:

- (21) a. Hans sollte **wann wo** darüber vortragen
H. should sometimes somewhere about that talk
'Hans should talk about it somewhere sometimes'
- b. *Hans sollte **wo wann** darüber vortragen

Another case of rigidity of adverbial pro-forms is found in Bulgarian with interrogative wh-phrases in multiple wh-fronting. The TempPP wh-phrase has to precede the LocPP wh-phrase, which in turn has to precede the MannerPP wh-phrase. See (22)–(24), from Krapova and Cinque (2004) (this may be related to the previous cases if the relative height of the wh-phrases in the COMP space reflects the pre-wh-movement relative height of the same phrases; see the discussion in Krapova and Cinque 2004):

- (22) a. **Koga kăde** ŝte hodiŝ tova ljato?
when where will go-you this summer 'When will you go where, this summer'
- b. ***Kăde koga** ŝte hodiŝ tova ljato?
where when will go-you this summer 'Where will you go when, this summer'
- (23) a. Iskam da znam **kăde kak** si se dărŝal.
I-want to know where how are-you behaved 'I want to know where you behaved how'
- b. *Iskam da znam **kak kăde** si se dărŝal.
I-want to know how where are-you behaved

- (24) a. Iskam da znam **koga kak** si se dāržal.
I-want to know when how are-you behaved 'I want to know when you behaved how'
- b. *Iskam da znam **kak koga** si se dāržal.
I-want to know how when are-you behaved 'I want to know how you behaved when'

Whether or not these asymmetries involving pro-forms can be reduced to the same cause (resistance to movement into Spec,FocusP), they provide further evidence that the order among the different PPs is not free.

In sum, the evidence so far reviewed seems to indicate that focus sensitive operations may conceal the existence of a strict order among the different complement and adverbial PPs, an order that becomes visible whenever some factor makes the focus sensitive operations unavailable. What remains to be determined is the status of what we have called the "canonical" order of PPs and, more important, whether or not it reflects the order of merge (assuming there to be a universal one).

2.2. Evidence for a hierarchical organization of complement and adverbial PPs

Earlier we took the rigid order of PPs that becomes visible under certain conditions to be the "canonical" order, with alternative orders (when possible) derived through additional focus sensitive operations. We also noted, however, that the canonical order of Temporal and Locative PPs in German appears to be the mirror image of that of Norwegian (TempPP > LocPP, for the former, vs. LocPP > TempPP, for the latter). We submit that the mirror-image relation between German and Norwegian (or English, for that matter) is: (1) entirely systematic across the various PP classes;¹⁵ (2) related to the OV versus VO character of the two languages;¹⁶ and (3) just a special case of a much wider left-right asymmetry found across languages.¹⁷

2.2.1. *The canonical order of adverbial PPs: An apparent cross-linguistic generalization*

To judge from the cross-linguistic study of Boisson (1981), Temporal, Locative, and Manner PPs when to the left of the verb (as is ordinarily the case in OV languages) are only found in that order; while after the verb they are found to occur either in the same or (more frequently) in the mirror-image order Manner > Locative > Temporal. What is conspicuously missing is the order Manner > Locative > Temporal before the V (cf. [25]):¹⁸

- (25) a. Temp > Loc > Manner V¹⁹
- b. *Manner > Loc > Temp > V²⁰
- c. V > Manner > Loc > Temp²¹
- d. V > Temp > Loc > Manner²²

- e. Dutch: Temp > Loc > Manner V & V > Manner > Loc > Temp (Koster 1974, 2000, Barbiers 1995)

This cross-linguistic generalization concerning Temporal, Locative, and Manner PPs (and the other circumstantial PPs—see Schweikert 2004) appears to be a special case of a much wider cross-linguistic generalization.

2.2.2. *An aside on left-right asymmetries*

Quite generally, what one finds across languages is that to the left of a head (N, V, etc.) the (unmarked) order of complements, adjuncts, auxiliaries, and modifiers is unique, while to the right of the head (at least) two possibilities are found; either the same order as that found to the left of the head or its mirror image. Greenberg's (1963) Universal 20 exemplifies this state of affairs for head = N. Cf. (26), which can also be expressed as (27):

- (26) When any or all of the items (demonstrative, numeral, and descriptive adjective) precede the noun, they are always found in that order. If they follow, the order is either the same or its exact opposite.²³

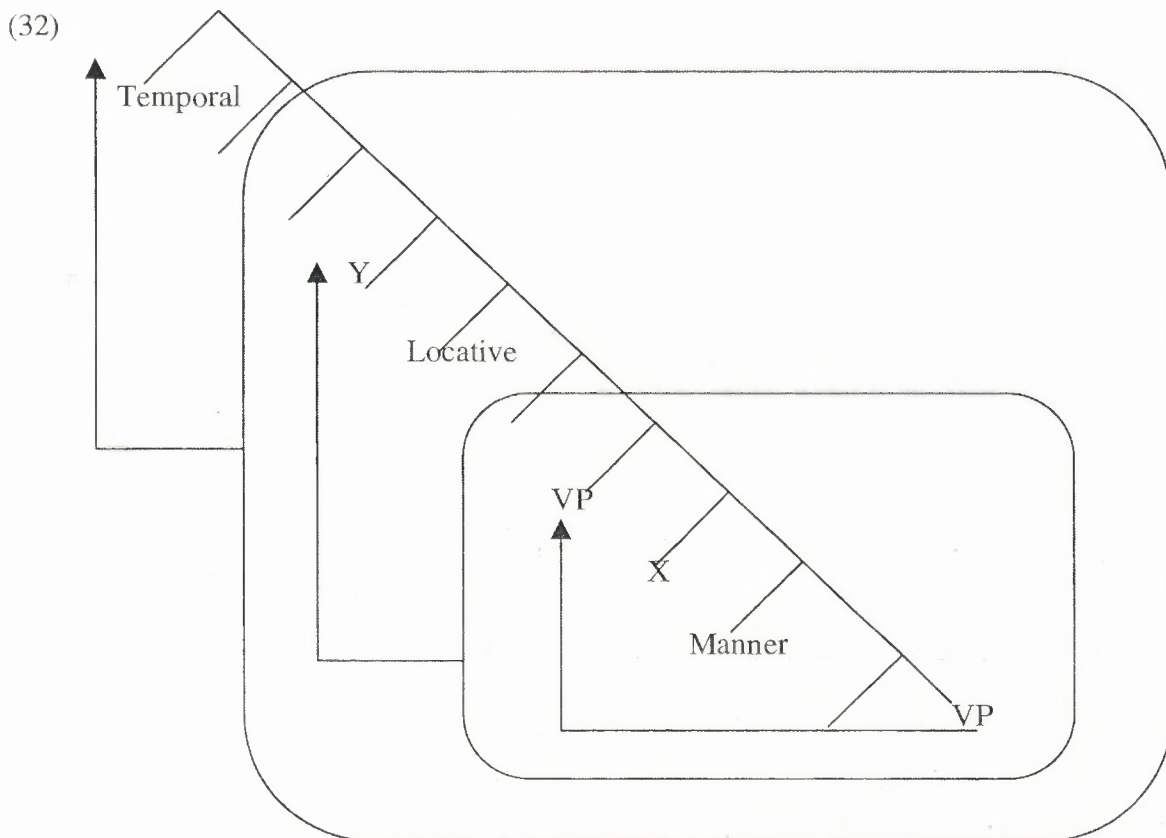
- (27) a. Dem > Num > A > N
 b. *A > Num > Dem > N
 c. N > Dem > Num > A
 d. N > A > Num > Dem

Exactly the same pattern is found with attributive adjectives (cf. [28], based on Hetzron 1978, Sproat and Shih 1988, 1991, and Cinque 1994, 2000a)²⁴; with adverbs (cf. [29], based on Rackowski 1998, Pearson 2000, Cinque 1999: 42f, Rackowski and Travis 2000); with auxiliary verbs (cf. [30], based on Koopman and Szabolcsi 2000 and Nilsen 2003); and, possibly, with (bare) direct and indirect objects (cf. [31], based on Blansitt 1973, Sedlak 1975, Lu 1998: chap. 7,²⁵ and Primus 1998):²⁶

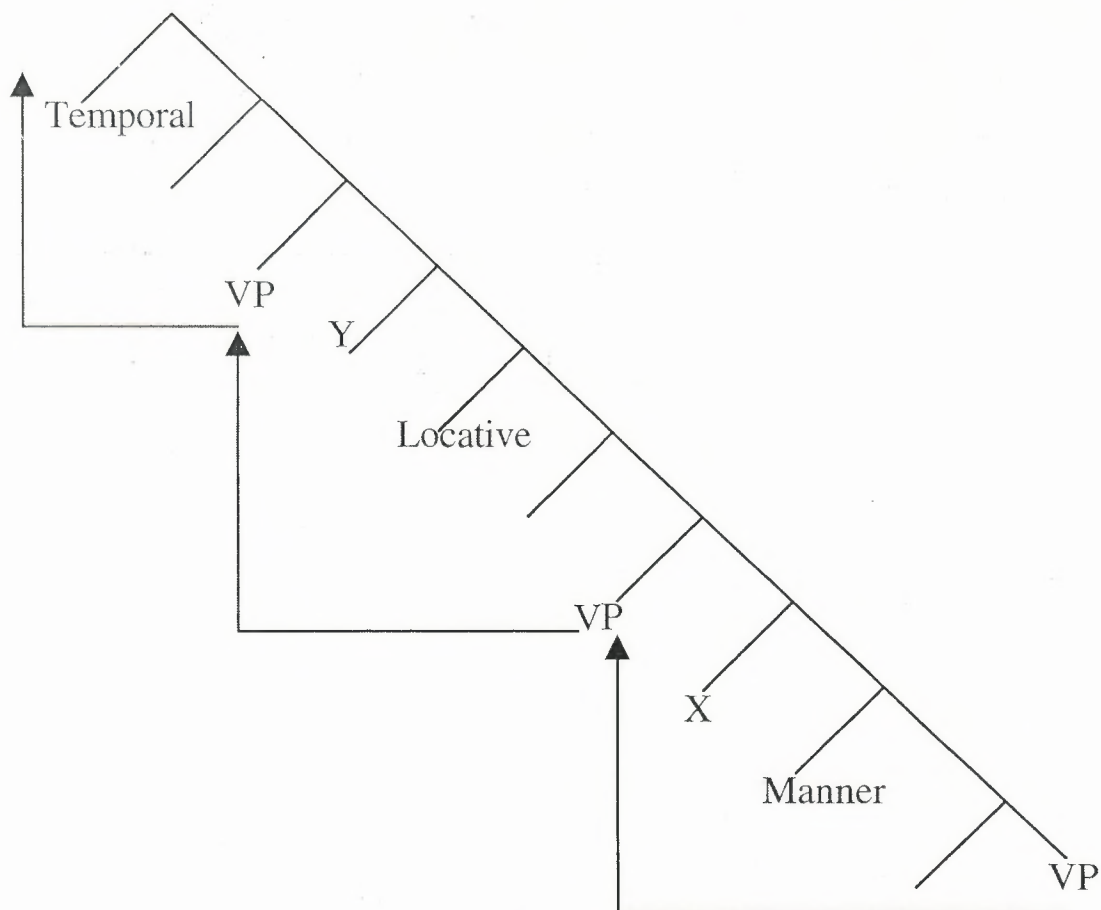
- (28) a. Adj₁ > Adj₂ > Adj₃ > N English, German, Bulgarian . . .
 b. *Adj₃ > Adj₂ > Adj₁ > N 0
 c. N > Adj₁ > Adj₂ > Adj₃ Irish, Welsh, Nawdm . . .²⁷
 d. N > Adj₃ > Adj₂ > Adj₁ Arabic, Indonesian, Yoruba, . . .
- (29) a. Adv₁ > Adv₂ > Adv₃ > V English, Chinese . . .
 b. *Adv₃ > Adv₂ > Adv₁ > V 0
 c. V > Adv₁ > Adv₂ > Adv₃ (Main clause) German . . .
 d. V > Adv₃ > Adv₂ > Adv₁ Malagasy, Niuean . . .

- (30) a. $Aux_1 Aux_2 Aux_3 V$ Italian, English . . .
 b. $*Aux_3 Aux_2 Aux_1 V$ 0
 c. $V Aux_1 Aux_2 Aux_3$ Hungarian
 d. $V Aux_3 Aux_2 Aux_1$ Hungarian, German . . .
- (31) a. $IO > DO > V$ (Eseejja, Kapau, Kewa, Maranungku, Mundari, Telefol . . .)
 b. $*DO > IO > V^{28}$ (0)
 c. $V > DO > IO$ (Biom, Cambodian, Diola Fogany, Iquito, Mapuche, Totonac . . .)
 d. $V > IO > DO$ (Bimoba, Fulani, Igbo, Luganda, Papiamentu, Vietnamese, Xhosa . . .)

Extending to the order of PPs what is proposed in Cinque (1996, 2000a, 2004a) to account for the pattern shown by DP modifiers, the asymmetry in (25) appears derivable, in Kayne's (1994) antisymmetric framework, from a unique (universal) order of merge (Temp > Loc > Mann > complements > VP) and the two possible ways in which the VP may successively raise: in essence, either pied-piping the phrase immediately dominating the Spec to which it has moved (cf. [32]) (with the effect of reversing the order of merge, to give VP > complements > Mann > Loc > Temp) or not pied-piping it (cf. [33]) (thus hopping around the adverbial PPs and preserving their order of merge):²⁹



(33)



This implies that in both types of languages Temporal PPs are merged higher than Locative PPs (which in turn are merged higher than Manner and complement PPs).³⁰

This hierarchical order is supported, as Nilsen (2000: 68ff) notes, by such contrasts in VP-Preposing as those in (34)–(37), which are independent of the canonical order instantiated by the language (LocPP > TempPP for Norwegian and English; TempPP > LocPP for German and Czech). This is because it is possible to front the smaller constituent formed by the verb and a lower PP, stranding a higher one, but it is not possible to front the verb and a higher PP without also fronting a lower one.³¹

- (34) a. Møtte Jon i parken gjorde jeg på fredag
met J in the park did I on Friday
- b. ?Møtte Jon på fredag gjorde jeg i parken
met J on Friday did I in the park

- (35) a. . . . and meet John in the park I did only on Friday
- b. ? . . . and meet John on Friday I did only in the park

- (36) a. Johann im Park getroffen habe ich nur am Freitag³²
J. in the park met have I only on Friday
- b. ??Johann am Freitag getroffen habe ich nur im Park
J. on Frida met have I only in the park

- (37) a. [Operovat v sobotu v garazi] ho bude Petr³³
operate on Saturday in the garage him will P.
- b. [Operovat v garazi] ho bude Petr v sobotu
operate in the garage him will P. on Saturday
- c.*[Operovat v sobotu] ho bude Petr v garazi
operate on Saturday him will P. in the garage

It is also supported, as Schweikert (2004) shows, by a number of other tests. So, for example, the scope interaction of *wh*-phrases and universal quantifiers appears to confirm the idea that Temporal PPs are higher than Locative ones, again independently of the canonical relative order of the two PPs in the language (TempPP > LocPP, as in German, or LocPP > TempPP, as in English):

- (38) a. Wo hat Hermann an jedem Tag gespielt?
b. Where did Hermann play every day?
- (39) a. Wann hat Hermann in jeder Stadt gespielt?
b. When did Hermann play in every town?

(38a) and (b) are ambiguous, depending on whether *wh*- takes scope over or under *every*. Corresponding to the first reading (*wh*- > *every*) there is only a single answer (*Hermann played every day in Cambridge*). Corresponding to the second reading (*every* > *wh*-) there is a pair list answer: *On Monday Hermann played in Cambridge, on Tuesday in Basingstoke . . .*

(39a) and (b) are not similarly ambiguous (at least under the normal intonation without pauses). Their only (or highly preferred) reading is the (*wh*- > *every*) one, which gives rise to the single answer: *On Monday (Hermann played in every town)*.

Assuming Wh/Q interactions to be regulated by a general scope principle like (40) later (see Aoun and Li 1993: chaps. 2 and 6), the ambiguity of (38a) and (b) and the nonambiguity of (39a) and (b) follow if Temporal PPs are higher than Locative PPs. In (38a) and (b), but not in (39a) and (b), the universal quantifier *c*-commands the trace of the *wh*-phrase (hence can take scope over it in the former, though not the latter, cases):

- (40) A universal quantifier A may have scope over a *wh*-quantifier B in case the merge position of A *c*-commands the merge position of B.³⁴

Following Schweikert (2004), I will take interpretive contrasts such as those in (38) and (39) to provide (confirming) evidence that Temporal PPs are merged higher than Locative PPs.

2.3. Reconciling “layered” and “cascade” structures

A structure like (1), which captures the properties listed in A, B, and C earlier (and is representative of the canonical order of PPs in English, Scandinavian, Romance, etc.),

is thus a *derived structure*, obtained by successively moving into higher Spec's larger and larger constituents that contain VP (a derivation compatible with antisymmetry):³⁵

(41) [I . . . [_{YP} [_{XP} [_{ZP} [_{VP} discussed] the problem] with John] on Monday]]

What about properties A', B', and C' (the binding of anaphors, and pronominals, and the licensing of NPIs, in English), which appeared to be incompatible with (1)? I submit that they can be captured on a structure intermediate between the structure of merge and the derived structure (1)/(41), if we assume, following Kayne (2002a, 2004), that prepositions are not merged with their (ultimate) complement but are merged higher up, immediately above the projections of Case to which each DP moves. As we will see, this makes it possible, before the roll-up derivation (i.e., the attraction of remnants), for the *bare* complement of a P to come to properly c-command the complement of another P after moving to the Spec of its own CaseP (in a structure that is essentially a [reverse] cascade structure).

Let us briefly review the relevant steps (for an English-type language). Assume a bottom-up derivation that starts with VP (containing just the V),³⁶ followed by merge of the innermost argument (the one that bears the Theme theta-role), followed by movement of VP, followed by merge of the next higher argument, followed by movement of the VP, followed by merge of a "circumstantial" DP, and so on:

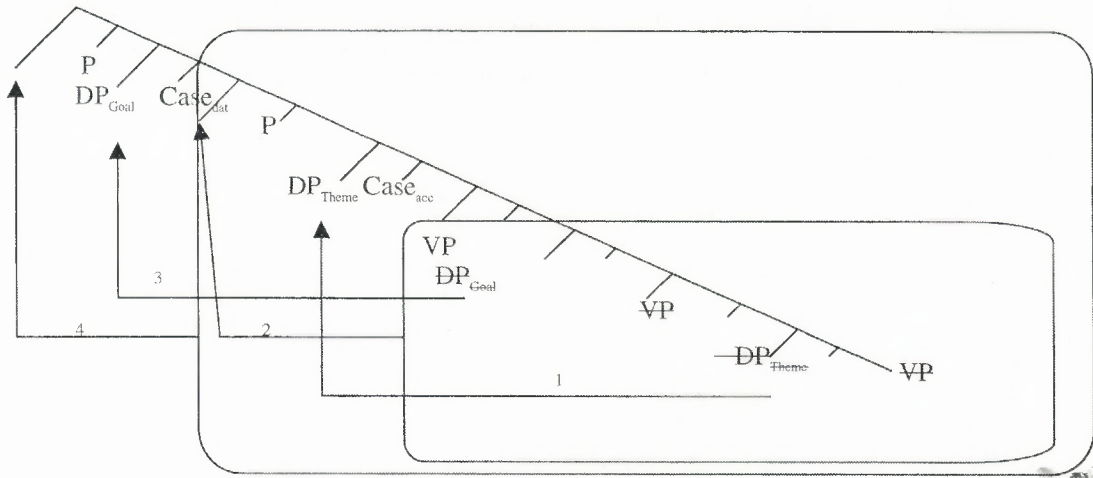
(42) VP → merge of a head
 [X VP] → merge of the Theme DP
 [DP [X VP]] → merge of a head
 [Y [DP [X VP]]] → movement of VP
 [VP [Y [DP₁ [X VP]]] → merge of a head
 [Z [VP [Y [DP₁ [X VP]]] → merge of the Goal DP
 [DP₂ [Z [VP [Y [DP₁ [X VP]]] →

Once the merge of argument and circumstantial DPs is completed, the corresponding CasePs are merged, followed by attraction of the corresponding DPs, followed by merge of the appropriate prepositions, followed by remnant movement:³⁷

See (43) and, in tree representation, (44):³⁸

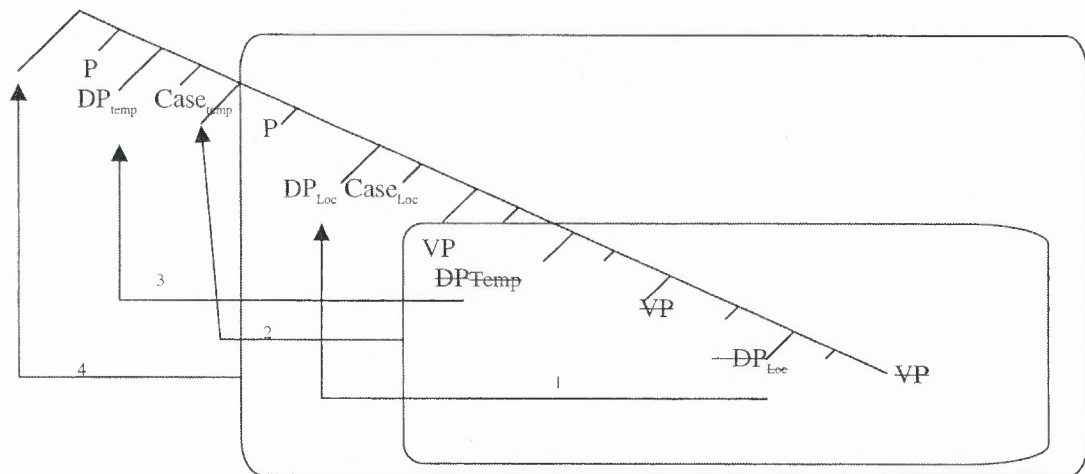
(43) . . . [^{VP} H [DP₂ [Z [^{VP} [Y [DP₁ [X ^{VP}]]] → merge of Case_{acc}[°]
 [Case_{acc}[°] [VP [H [DP₂ [Z [^{VP} [Y [DP₁ [X ^{VP}]]] → attraction of DP₁
 [DP₁[Case_{acc}[°] [VP [H [DP₂ [Z [^{VP} [Y [DP₁ [X ^{VP}]]] → merge of (abstract) P
 [0 [DP₁[Case_{acc}[°] [VP [H [DP₂ [Z [^{VP} [Y [DP₁ [X ^{VP}]]] → attraction of remnant
 [VP [H [DP₂ [Z [^{VP} [Y [DP₁ [X ^{VP}]]]]]] [0 [DP₁[Case_{acc}[°] []]] → merge of Case_{dat}[°]
 [Case_{dat}[°] [VP [H [DP₂ [Z [^{VP} [Y [DP₁ [X ^{VP}]]]]]]] [0 [DP₁[Case_{acc}[°] []]] → attraction
 of DP₂
 [DP₂ [Case_{dat}[°] [VP [H [DP₂ [Z [^{VP} [Y [DP₁ [X ^{VP}]]]]]]] [0 [DP₁[Case_{acc}[°] []]] →
 merge of P
 [P [DP₂ [Case_{dat}[°] [VP [H [DP₂ [Z [^{VP} [Y [DP₁ [X ^{VP}]]]]]]] [0 [DP₁[Case_{acc}[°] []]] →
 attraction of remnant
 [VP [H [DP₂ [Z [^{VP} [Y [DP₁ [X ^{VP}]]]]]]] [0 [DP₁[Case_{acc}[°] []]] [P [DP₂ [Case_{dat}[°] []]]]

(44)



If instead of Theme and Goal, we had Locative and Temporal DPs, the derivation would have proceeded in a similar way, giving:

(45)



This derivation has a step (the one with the DP_{Loc} raised to its Case position) in which the object of the locative preposition literally c-commands the temporal DP. We take this step to license the anaphor in (7a), the bound pronominal in (8a), and the NPI in (9a), before the “roll-up” derivation (the repeated attraction of remnants) disrupts the relevant c-command relations.

Even though in the final derived structure the object of the locative P does not c-command the object of the temporal P, it did at an earlier (intermediate) stage,³⁹ a situation non-dissimilar from that found in (46a–c), where the relevant relations are licensed at an earlier stage of the derivation (alternatively, under reconstruction):

- (46) a. Which pictures of *each other*_i did *they*_i bring to the party?
 b. Which of *his*_i friends would *everyone*_i like to see in such circumstances?
 c. A doctor with *any* knowledge of acupuncture, I did *not* meet

The binding of anaphors that are not embedded in another DP is subject to more stringent conditions than the binding of anaphors embedded in another DP. Consider (17a–b), repeated here as (47), and (48)–(52):⁴⁰

- (47) a. John talked to the men about each other
 b.*John talked about the men to each other
- (48) a. I introduced the students only to each other
 b.*I introduced to the students only each other⁴¹
- (49) a. I introduced the students to each other's supervisors only
 b. I introduced to the students each other's supervisors only
- (50) a. John talked to the men about each other's supervisors
 b. John talked about the men on Tuesday to each other's supervisors (Pesetsky 1995: 271)
- (51) a. John spoke about these countries in each other's capital cities
 b.*John spoke about these countries in each other
- (52) a. John spoke in these countries about each other's capital cities
 b.*John spoke in these countries about each other

It seems that only direct and indirect objects qualify as possible antecedents of an unembedded anaphor (cf. [47a]/[48a] vs. [51b]/[52b]). Moreover, it seems that the antecedent has to be merged lower than the (unembedded) anaphor (as is the direct object in [48], and the indirect object in [47]). If we take Spec,Case_{Acc} and Spec,Case_{Dat} to differ from all other Spec,Case (in that they qualify perhaps as derived A-positions), then the condition on (unembedded) anaphor binding could be given as in (53):

- (53) An unembedded anaphor has to be bound in its merge A-position from a derived A-position⁴²


This appears to correctly distinguish (48a) and (47a), which satisfy (53) at the intermediate stages (54) and (55), respectively, from all the impossible cases (48b)/(47b)/(51b)/(52b) (which do not satisfy it):⁴³

(54) ... [0 [Case_{AccP} the students [Case_{Acc} [GoalP each other [ThemeP t [VP]]]]]]

(55) ... [to [Case_{DatP} the men [Case_{Dat} [SubjMattP each other [GoalP t [VP]]]]]]

If an (unembedded) anaphor could be bound in its merge A-position from another (higher) merge A-position, in contrast to (53), then **I introduced only each other to the students* (or **I introduced to the students only each other*) would be well formed.

A possible independent argument for (53) and against allowing binding into a merge A-position from a (higher) merge A-position is provided by the following contrast in German (from Frank, Lee, and Rambow 1996: 89):⁴⁴

- (56) a. *Gestern habe ich den Gästen einander vorgestellt
 yesterday have I the guests-Dat each other introduced
 'Yesterday I introduced the guests to each other'
- b. Gestern habe ich die Gäste_i einander t_i vorgestellt

 yesterday have I the guests-Acc each other introduced
 'Yesterday I introduced the guests to each other'

Anaphors embedded in another DP seem to pattern with pronominals bound by quantifiers and NPIs in allowing the antecedent to be other than a direct or indirect object (compare [51a] with [59a]/[60a]) and even to be merged in a (possibly non-A) position higher than that hosting the anaphor (compare [49b]/[50b] with [57b]/[58b]/[59b]/[60b]):

- (57) a. I talked to no man_i about his_i son
 b. I talked about no man_i to his_i son
- (58) a. I talked to no one in the room about any one of the candidates
 b. I talked about no one in the room to any one of the candidates
- (59) a. John spoke about no man_i in his_i hometown
 b. John spoke in no town_i about its_i citizens
- (60) a. John spoke about no city in any country that he had visited
 b. John spoke in no country about any city that he had visited

A serious analysis of these facts (whose grammatical status, incidentally, is sometimes a matter of disagreement⁴⁵) goes well beyond the limits of this work.⁴⁶ I will rather conclude by mentioning Schweikert's (2004) finding that not only (complement and) Time and Place PPs are hierarchically ordered with respect to each other, but also the same holds of the remaining circumstantial PPs. On the basis of a number of syntactic tests (which appear to give converging results), he arrives at the following hierarchy of circumstantial PPs: Evidential > Temporal > Locative > Comitative > Benefactive > Reason > Source > Goal > Instrumental/Means > Matter > Manner. As stated in note 1, this hierarchy shows an interesting overlap with the one arrived at by Damonte (2004) on the basis of the corresponding verbal "extensions" of Fulfulde and Quechua (Benefactive > Reason/Source/ Goal > Locative/Instrumental/Manner > Comitative). Such a convergence can hardly be accidental, and the few discrepancies that are found should be examined more closely to see whether they

could be due to one circumstantial PP or affix occupying two or more (related) functional projections.⁴⁷

Should these conclusions be confirmed by further research, we will have a partially new picture of the lower portion of the clause, one that is hierarchically structured more rigidly than it is generally assumed.

Notes

This chapter represents a version, written in 2004, of a paper presented at the 25th annual GLOW Colloquium in Amsterdam (April 9–11, 2002). I wish to thank Adriana Belletti, Paola Benincà, and Richard Kayne for their useful comments on a previous draft.

1. The order suggested by Schweikert (2004) (see later) shows a significant overlap with the one arrived at by Damonte (2004) on the basis of the corresponding verbal “extensions” of Fulfulde and Quechua, two languages with particularly rich verbal morphology encoding “circumstantial” roles that appear as adverbial PPs in other languages.

2. See Larson (1988, 1990), Kayne (1994: 69ff), and Chomsky (1995: 333), among others.

3. See Lakoff (1968: 11) and Reinhart (1983: 60).

4. Example (3) contrasts with (i), in which the pronoun c-commands the R-expression from the subject position (see Manzini 1995):

(i) a. *He_i was killed [on the very same day John_i was being released from prison]

b. *He_i was hit [without John_i being able to defend himself]

If the structure in (1) is not one of adjunction, as I will argue later, the relevant definition of c-command can be as in Kayne (1994: 16).

5. Coordination and ellipsis phenomena are usually taken (*pace* Phillips 2003) not to be as reliable, as the possibility exists that more structure is involved than is actually visible.

6. This scope property is also typical of VP-final adverbs (Andrews 1982), although the reverse is also possible (Cinque 1999: sect. 1.4, Koster 2000: sect. 2.5, Phillips 2003: 71f).

7. Larson (2003) contains a potential way to reconcile the leftward scope seen in (6) with a rightward descending structure. Concerning VP-final adverbs he suggests that they appear to take scope over what precedes them not because they c-command it but by virtue of being (event, quantity, etc.) predicates corresponding directly with a right descending syntax for adverbial attachment under the Mapping Hypothesis of Diesing (1992) (*John knocked on the door intentionally twice* would, for example, correspond to “John’s intentional knockings were two”). The same could be proposed for VP-final PPs. Though interesting, it is, however, not clear how such a solution can express the typological generalization relating VO and OV languages discussed here (see note 29 below and related text). Furthermore, as Larson himself noted in his presentation at NELS, it is also not clear how such predication approach can be extended to the leftward scope of such adverbs as *yet*, *no longer*, *already*, etc., in VP-final position.

8. But see Larson’s (1990: 607) observation that *Mary* in (11b) bears “relatively greater stress” than *Bill* in (11a), suggesting the presence in the former of a heaviness effect of some sort.

9. It is generally assumed that the former (Theme, Experiencer, Goal, Agent, . . .), being borne by the arguments of a predicate, are selected and obligatory, while the latter (Manner, Place, Time, Duration, Instrument, Purpose, etc.) are nonselected and optional. The distinction, however, is not as clear-cut, as the latter, too, depending on the predicate, can be selected

and obligatory. See, for example: (Manner) *Pat behaved *(in a rude manner) to practically everybody* (see Fillmore 1994: 159; Cinque 2004b (chapter 5, here): fn. 17 and relative text); (Place) *All powers reside *(in the emperor)*; (Time) *The show used to begin *(at 9)*; (Duration) *The concert lasted *(for two hours)*; etc. For further relevant discussion, see Dowty (2000).

10. I borrow the term from Pesetsky (1995: chap. 3), generalizing it beyond his Subject Matter of Emotion (as in *John worried about the television set*).

11. Note that idiom chunks (depending on the idiom) can be found displaced in non-focus constructions (see Cinque 1977: § 1.4). This is also the case with the present idiom: *Di corda, non devi parlarne in casa dell'impiccato!* I thank Paola Benincà for discussion on this point.

12. See also Jackendoff (1990: 430ff), Larson (1990: 608), and Pesetsky (1995: 270).

13. As (7)/(8)/(9) show, the contrast in (17) cannot be due to lack of c-command in (17b) vs. (17a), where *to* could be argued to be a Case marker rather than a genuine preposition. In (7), (8), and (9) the object of *about* can bind an anaphor (provided it is within a larger phrase). See later for further discussion.

14. Richard Kayne informs me that David Perlmutter noted, in personal communication with him, a similar contrast in English: *He went there then* vs. **He went then there*, although the contrast is not as clear when *there* is a Locative rather than a Directional pro-form. See *He got his first job there then* vs. *?He got his first job then there*. Perhaps movement to Spec,Focus is, for some reason, more difficult for a selected Directional pro-PP than it is for a Locative pro-PP (in fact, Richard Kayne, personal communication, finds *It was there that he saw them* more natural than *?It was there that he sent them*).

15. Suggestive evidence to this effect in German vis-à-vis English is contained in Rosengren (2000) and Haider (2004).

16. See Haider (2000, 2004), Hinterhölzl (2001, 2002), and Cinque (2002a).

17. See Cinque (1996, 2000a, 2002a, 2004a), where such left-right asymmetry is shown to follow from antisymmetry.

18. Hawkins (2000: 231f) expresses reservations about the solidity of Boisson's generalization owing the fact that it does not find "empirical support in a corpus of written [English] data." However, as noted earlier, failing to tease apart alternative orders produced by focus sensitive movements (as may be difficult to do in a written corpus) can obscure the picture.

19. "Les langues suivantes ont un ordre Tmp—Loc—Man—Vrb : chinois mandarin, gujarati, lamani, penjabi, zuni. Le lamani a, plus précisément, Tmp—Loc—Ins—Man—Vrb" (Boisson 1981: 80). Other (OV) languages reported to have this order are German (Haider 2000, Hinterhölzl 2001, 2002), Turkish (Jaklin Kornfilt, personal communication), Nenets (Vilkuna 1998: 203), and Konda (Krishnamurti and Benham 1998: 266), among others.

20. "Man—Loc—Tmp—Vrb n'est pas attesté, mais son image en miroir Vrb—Tmp—Loc—Man serait valable pour l'égyptien ancien" (Boisson 1981: 80). (The same order is also found in Middle Egyptian—Boisson 1981: 75.)

21. Many (most?) VO languages instantiate this order; among them English, Norwegian (Nilsen 2000: chap. 3); Ixil, Mixtec de Jacaltepec, Tzotzil (Boisson 1981: 80), Romance languages, etc.

22. The languages instantiating this order are not many. Apparently, Old and Middle Egyptian (as noted in note 20 earlier), Otomi (Boisson 1981: 76), Czech (as given in Nilsen 2000: 73f), and German (in V/2 clauses).

23. This is, in fact, a simplification, which, however, does not affect the thrust of the argument. While the prenominal order is Dem > Num > Adj without exceptions (or virtually so), more possibilities than the two Dem > Num > Adj and Adj > Num > Dem are actually

attested postnominally (see Cinque 2004a for a review and for an illustration of how they can be derived through different leftward movements).

24. For concreteness, let us take Adj_1 to stand for size adjectives, Adj_2 for color adjectives, and Adj_3 for provenance adjectives.

25. “The orders of direct and indirect objects (hence DO and IO respectively) also demonstrate some left-right asymmetry. If both DO (direct object) and IO (indirect object) follow V, IO frequently stays nearer to V than DO does, as exemplified in English and Chinese ‘dative shift.’ In Mandarin Chinese, the order [V IO DO] is in fact used much more frequently than the order V DO IO and is hence viewed by some grammarians as canonical, basic order. By contrast, if both DO and IO precede V, the corresponding mirror-image order [DO IO V] is never taken as a canonical order” (Lu 1998: 207).

26. As Arhonto Terzi pointed out to me (personal communication), another phenomenon that apparently shows the same pattern is the order of clitics in Modern Greek. See Terzi (1999). To the left of the V only the order Dat-Acc is possible, while to the right of the V both Dat-Acc and the opposite order, Acc-Dat, are possible.

27. Willis (2003) points out that while the postnominal order of size, color, and provenance adjectives in Welsh indeed is as in English, the language shows mirror-image order effects with other adjectives. For example, the relative order of quality (evaluative), age, and comparative/superlative adjectives and of the adjective *other* and the demonstrative is the mirror image of the English order: N (size > color > provenance >) age > quality > comparative/superlative > *other* > demonstrative. We take this to suggest (differently from Cinque 1994) that Welsh, too, involves NP- rather than N-raising. What needs to be assumed (*pace* Willis 2003) is that the NP raises from Spec to Spec around size, color, and provenance adjectives, with subsequent movements pied-piping the node dominating the Specifier targeted by the movement, thus systematically reversing the order of all higher adjectives and modifiers (except numerals).

28. Blansitt (1973) notes that “of the eight languages for which SODV [Subj DO IO V] is the only bitransitive order shown, all except WESTERN DESERT [APACHE] and SOMALI have only a relator-marked indirect object and in SOMALI the indirect object appears marked in some verbs” (p. 13f). He then goes on to say: “This fact is interesting, in spite of the small number of languages of this type in the survey, because approximately half of the languages examined have an unmarked indirect object. This observation appears even more important in view of the fact that MUNDARI is SDOV with unmarked indirect object and SODV when the indirect object is marked” (p. 14). In view of this, I conjecture that the generalization in (31) (namely, that, to the left of the V, *bare* (Blansitt’s *unmarked*) IO invariably precede *bare* DO) is essentially confirmed and that Somali has a (sometimes covert) IO marker (and so perhaps does Western Desert Apache).

29. This is a simplification, to be qualified later. On the more general validity of the pied-piping/non-pied-piping parameter, see Koopman and Szabolcsi (2000). Note that a Larsonian type of merge of postverbal complements, adverbials (V PP₁ PP₂ PP₃) (and adverbs—see Larson 2003) cannot naturally express a unique UG order of merge (and scope) of these elements, as it would have to derive the mirror-image order (PP₃ PP₂ PP₁V) found preverbally independently of the other (V PP₁ PP₂ PP₃), either via merge or through “nested” movements of the PPs. For similar criticism, see Hinterhölzl (2001, 2002), whose analysis shares with ours the idea that the “English” order essentially derives from the “German” order via successive XP “intrapositions.” Also see Baltin’s (2003) evidence from British English *do* for locating adverbial PPs higher than complement PPs (the former, though not the latter, can co-occur with *do*, which has the behavior of a “deep anaphor” for V plus its complements, which leaves out adverbial PPs).

30. Josefsson and Platzack (1998: 33ff) also argue that adverbial PPs are in Spec positions of VP-shells above the lexical VP, with Temporals above Locatives.

31. The contrasts in (34)–(37) are not as sharp as one should expect, perhaps due to the (marked) possibility for the focus sensitive operation that reverses the order of the two PPs to feed VP-Preposing. Richard Kayne (personal communication) finds a comparable contrast in the (focus) fronting of the two PPs: *Only on Friday did I meet John in the park vs. ?Only in the park did I meet John on Friday.*

As Nilsen (2000: 76) notes, in an approach that assumed “scrambling” of one or the other PP followed by remnant movement to COMP of what is left, such contrasts as (34) (and [35], [37]) would not be immediately understandable. This may be a general difficulty for any “remnant movement” solution to Pesetsky’s paradox (such as Lechner’s 2003 and Baltin’s 2003). Phillips (2003) presents a different solution to Pesetsky’s paradox, based on a top-down incremental merge of the PPs. For difficulties encountered by such a solution, see Lechner (2003) and Cinque (2004b, fn. 27).

32. I thank Walter Schweikert for the judgments in question.

33. Czech being a “clitic second” language, whatever precedes the second position clitic will have to be a constituent (see Nilsen 2000: 74).

34. This also carries over to the classical contrasts in (i) (May 1985: 37ff and references cited there) and those in (ii) and (iii) (Aoun and Li 1993: chap. 6):

- (i) a. What did everyone buy (for Max)? (ambiguous)
- b. Who bought everything (for Max)? (unambiguous)
- (ii) a. Where did everyone hit him? (ambiguous)
- b. Where did he hit everyone? (unambiguous)
- (iii) a. When did everyone hit him? (ambiguous)
- b. When did he hit everyone (unambiguous)

For the case of *why* and *how* and the variation in speakers’ judgment, see the discussion in Aoun and Li (1993).

35. As noted earlier (cf. [16] and relative text), we take such marked orders as *I talked on Monday with John* to derive from the (already-derived) “canonical” structure I [[[talked] with John] on Monday] through movement to Spec,FocusP of the constituent that eventually becomes rightmost, followed by merge of a head and attraction of the remnant. For a proper constituent to move, the VP will need first to extract (as it presumably does in such cases as: I [talked] briefly [[t with John] on Monday]).

36. This amounts to saying that only functional projections are fully recursive Spec-Head-Complement structures, recursion stopping with the lexical projection, or that arguments are necessarily merged as specifiers of the extended projection of a lexical X⁰/XP. More radical approaches are also conceivable (see Starke 2004 and Manzini and Savoia 2004). Recall that in a Larsonian VP-shell structure the direct object can be either in complement or in specifier position, depending on the presence of other (lower) complements and adjuncts, with an apparent weakening of the UTAH, which is to be taken in a relative rather than absolute sense (see Larson 1990: §2.3).

37. See Kayne (2002a). As in Kayne (2005; §5.6), I take “attraction of the remnant” to Spec,P to involve not the complement of the P itself but the complement of the next head down. OV languages may be taken to differ from VO languages in not moving the remnant to Spec,P. If the VP has to raise to Spec,T, as is plausibly the case in German and other languages, it does so by pied-piping all intermediate nodes (as in *picture of who* pied-piping).

38. As Nicola Munaro observed (personal communication), there is an apparent redundancy. The hierarchical order of the argument and other participant PPs is duplicated by the order of the corresponding Case positions (and related Ps), to the effect that the lowest argument raises to the lowest Spec,CaseP, the lowest minus one argument raises to the lowest minus one Spec,CaseP, and so on. In a (relativized) minimality approach, this pattern could follow in the same way Krapova and Cinque (2004) propose to derive the hierarchical order preservation of *wh*-phrases. In a “closeness-driven” movement approach (Kayne 2005), this might suggest that the merge of the related Case and P takes place immediately after the merge of the corresponding DP (before the next argument/participant DP is merged).

For the idea in (43)/(44) of an abstract P merging above Case_{acc}, see perhaps Spanish *a*, Romanian *pe*, etc., which precede (certain) objects.

39. Alternatively, it continues to under a copy theory of reconstruction (Chomsky 1995: chap. 3).

40. (50)–(52) are from Pesetsky (1995), who attributes (51b) to Peter Svenonius.

41. Richard Kayne (personal communication), however, thinks that (48b) becomes better in contexts such as the following:

(i) a. ?John is planning to introduce to the advisees he has this year neither each other nor any of his colleagues

b. ?(?) John is planning to introduce to the advisees he has this year only each other

42. It may be that (53) is not general enough. Richard Kayne (personal communication) notes a similar contrast between *John and Mary were letting the honey drip on each other's feet* vs. **? . . . on each other*. Also see the contrast mentioned in Kayne (2003: fn. 23):

(i) a. ?Each other's friends have insulted John and Bill once again

b. *Each other have/has insulted John and Bill once again

43. Adriana Belletti suggests that that the more stringent condition on unembedded anaphors vis-à-vis embedded anaphors could follow in this analysis from Principle C of the Binding Theory. [each other]_i would come to c-command and bind *the men* from a derived A-position in the derivation of (47b) and *the students* in that of (48b), but not in (49b), nor in (50b), as in the latter it is embedded in a larger phrase ([[each other]_i's . . .]_k). If so, (53) could perhaps be simplified to: An anaphor has to be bound in its merge A-position from a derived A-position. The ungrammaticality of such cases as **Hanno abbandonato se stessa a Maria/a Maria se stessa* ‘they abandoned herself to Mary’, **?Questa terapia ha restituito se stessa a Maria/ a Maria se stessa* ‘this therapy restituted herself to Mary’ would similarly follow.

44. As Richard Kayne points out (personal communication), the point about (56) is actually complicated by the fact that *vorstellen* is one of the verbs for which Hubert Haider argued that the canonical order is Acc-Dat. This conclusion also requires a separate treatment for Barss and Lasnik's (1986) sentences like *I showed John himself (in the mirror)*, perhaps in terms of a small clause analysis.

45. (57) and (58) reflect the judgments given in Jackendoff (1990: 432), but Larson (1990: 608) gives (57b) as “*?”, and an example comparable to (58b) as “??”.

46. Cases (ib)/(ivb) can perhaps be distinguished from (57b)/(60b) in terms of Weak Crossover, although the more severe ungrammaticality of (iib)–(ivb) (vs. the simple marginality of (ib) suggests that other factors are involved:

(i) a. John talked to no man_i about his_i son

b. ?John talked about his_i son to no man_i

- (ii) a. John talked about no man_i to his_i son
 b.*John talked to his_i son about no man_i
- (iii) a. I talked to no one in the room about any one of the candidates
 b.*I talked about any one of the candidates to no one in the room
- (iv) a. I talked about no one in the room to any one of the candidates
 b.*I talked to any one of the candidates about no one in the room

47. For clues concerning the possible existence of different Comitative and Locative projections, see the discussion in Damonte (2004: 39ff) and Maienborn (2001), respectively. As Tom Roeper pointed out to me (personal communication), the hierarchical order of participant PPs may also be at the basis of certain restrictions in nominal compounds. He notes that while compounding of an N with an instrument role (*hand made* 'made by hand') and one with a locative role (*factory made* 'made in a factory') are equally possible, there are certain combinatorial restrictions. While the instrument can be compounded in the presence of a locative PP (*hand made in a factory*), a Locative cannot if an instrument PP is also present (**factory made by hand*). This might suggest that compounding has to proceed bottom-up from the N that bears the lowest participant role (in this case, instrument), without skipping positions, a conclusion apparently corroborated by word order contrasts like the following (also noted by him): *?factory hand made* vs. **hand factory made*.