

## Complement and Adverbial PPs: Implications for Clause Structure

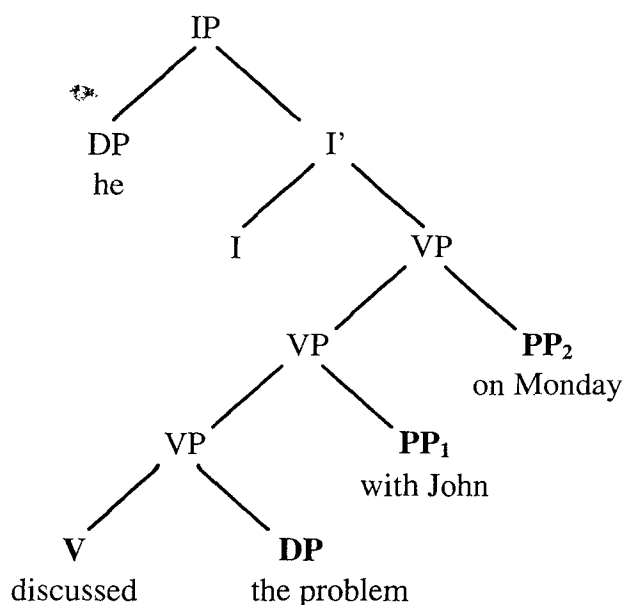
### 1. Introduction

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.<sup>1</sup>

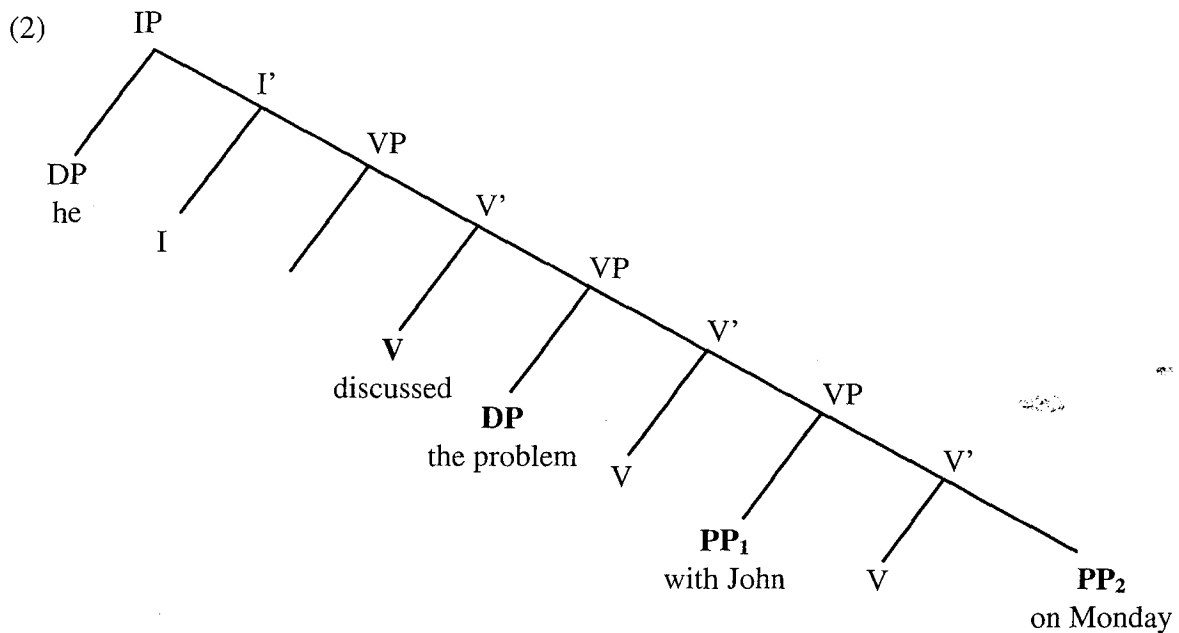
Although the order of PPs in *postverbal* position (typical of VO languages) is in general the mirror image of the order of the same PPs in *preverbal* position (typical of OV languages), their relative height (and scope) turns out to be the same, a property that I will take to suggest a universal order 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:<sup>2</sup>



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):<sup>3</sup>

- (3) a. They killed him<sub>k</sub> [on the very same day John<sub>k</sub> was being released from prison]  
 b. They hit him<sub>k</sub> [without John<sub>k</sub> 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.<sup>4</sup>

B. *Constituency diagnostics*. If movement is a reliable constituency test, as standardly assumed (Pesetsky 1996),<sup>5</sup> 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):<sup>6</sup>

- (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.<sup>7</sup>

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).*

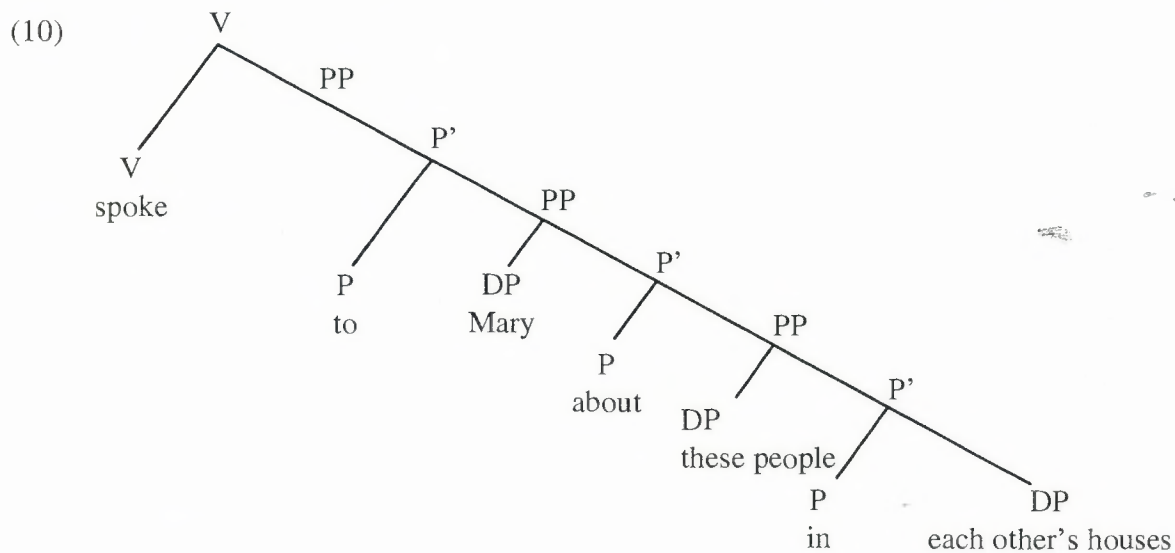
- (9) a. John spoke to Mary about *no linguist* in *any conference room* (Pesetsky 1995: 162)  
 b. \*John spoke to Mary about *any linguist* in *no conference room*

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):<sup>8</sup>

(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).<sup>9</sup>

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 Matter<sup>10</sup> 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. . . . [<sub>FocP</sub> to Mary F [<sub>VP</sub> talked t about Bill]] →  
 c. . . . [<sub>XP</sub> [<sub>VP</sub> talked t about Bill] X [<sub>FocP</sub> 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])<sup>11</sup> 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)<sup>12</sup> 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."<sup>13</sup>

- (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<sub>i</sub> did John talk to t<sub>i</sub> about Harry yesterday?  
 b.??Who<sub>i</sub> did John talk about t<sub>i</sub> to Harry yesterday?  
 (19) a. Who<sub>i</sub> did John talk to Harry about t<sub>i</sub> yesterday?  
 b.??Who<sub>i</sub> did John talk about Harry to t<sub>i</sub> 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).<sup>14</sup>

- (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 kade** šte hodiš tova ljato?  
when where will go-you this summer 'When will you go where, this summer'
- b. \***Kade koga** šte hodiš tova ljato?  
where when will go-you this summer 'Where will you go when, this summer'
- (23) a. Iskam da znam **kade kak** si se dăržal.  
I-want to know where how are-you behaved 'I want to know where you behaved how'
- b. \*Iskam da znam **kak kade** si se dăržal.  
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;<sup>15</sup> (2) related to the OV versus VO character of the two languages;<sup>16</sup> and (3) just a special case of a much wider left-right asymmetry found across languages.<sup>17</sup>

### 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]):<sup>18</sup>

- (25) a. Temp > Loc > Manner V<sup>19</sup>
- b. \*Manner > Loc > Temp > V<sup>20</sup>
- c. V > Manner > Loc > Temp<sup>21</sup>
- d. V > Temp > Loc > Manner<sup>22</sup>



- 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.<sup>23</sup>

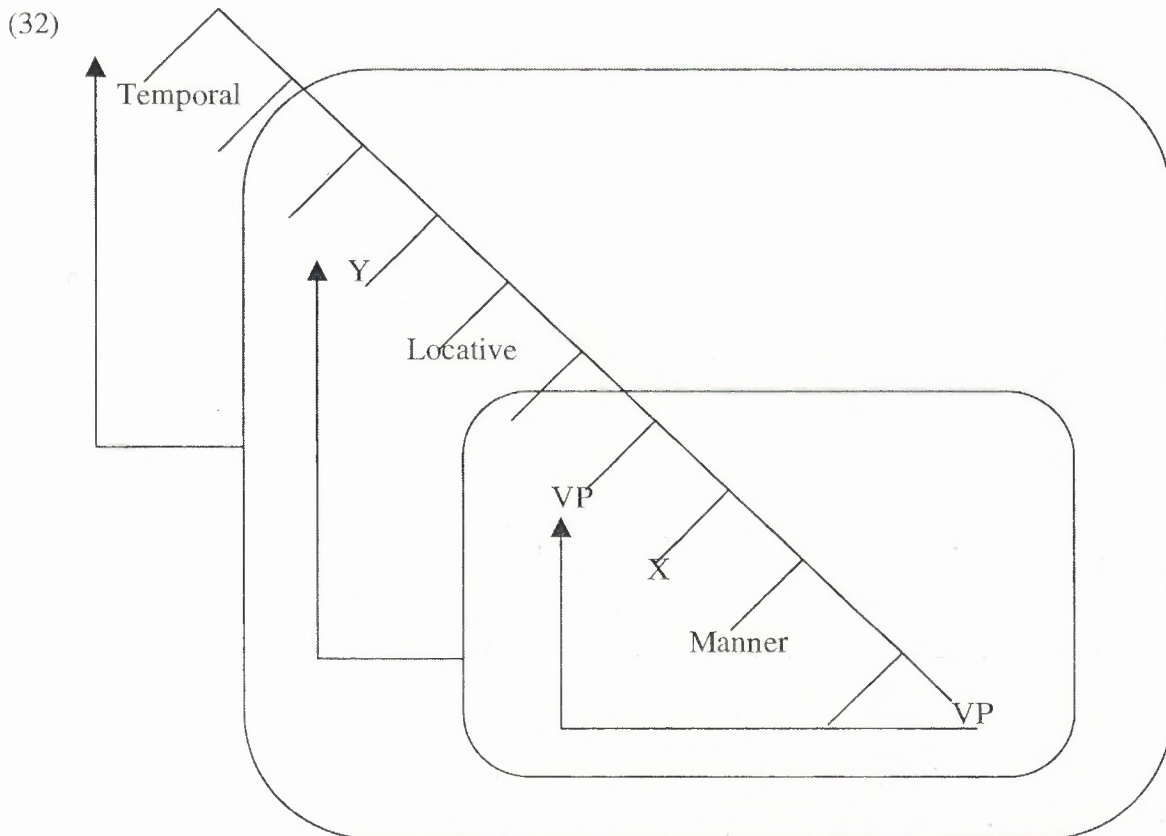
- (27) a. Dem > Num > A > N  
 b. \*A > Num > Dem > N  
 c. N > Dem > Num > A  
 d. N > A > Num > Dem

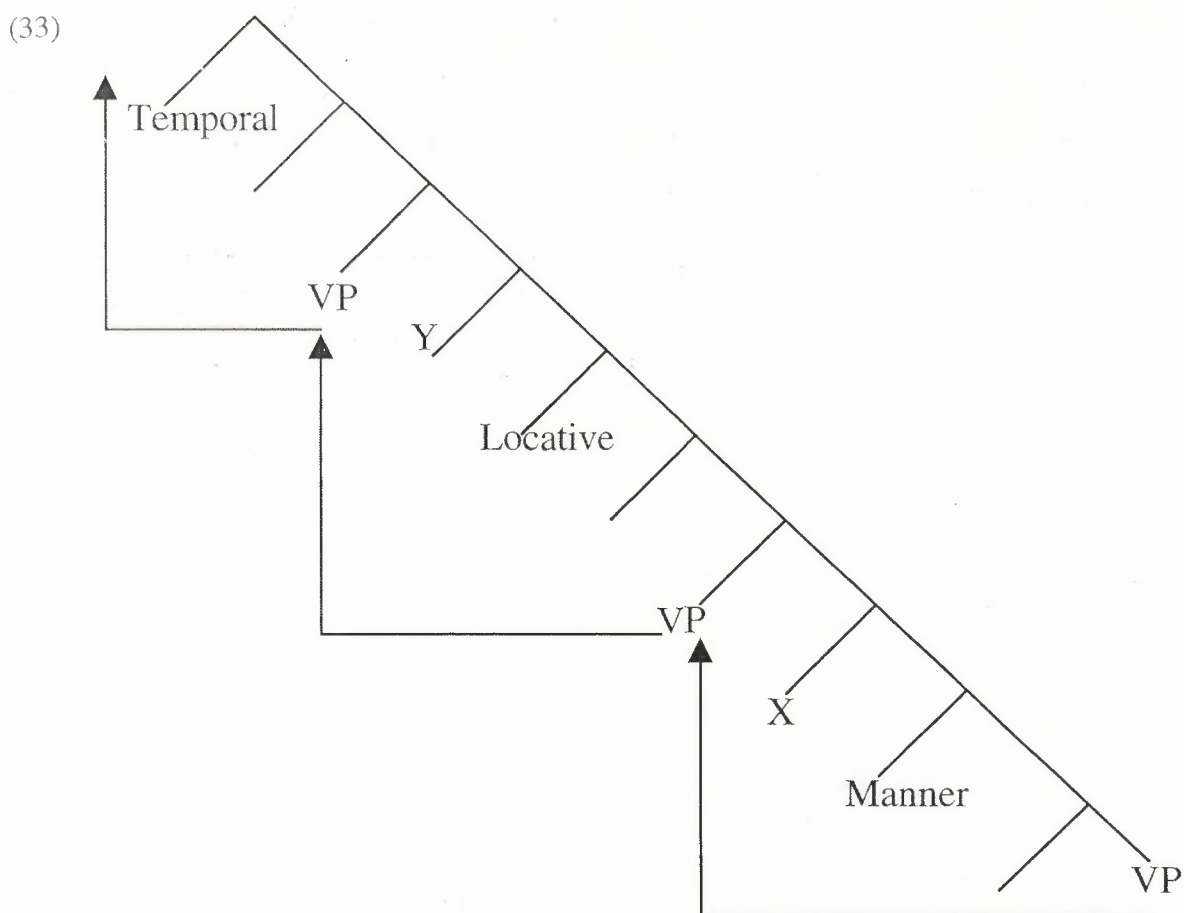
Exactly the same pattern is found with attributive adjectives (cf. [28], based on Hetzron 1978, Sproat and Shih 1988, 1991, and Cinque 1994, 2000a)<sup>24</sup>; with adverbs (cf. [29], based on Rackowski 1998, Pearson 2000, Cinque 1999: 42f, Rackowski and Travis 2000); with auxiliary verbs (cf. [30], 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,<sup>25</sup> and Primus 1998):<sup>26</sup>

- (28) a. Adj<sub>1</sub> > Adj<sub>2</sub> > Adj<sub>3</sub> > N      English, German, Bulgarian . . .  
 b. \*Adj<sub>3</sub> > Adj<sub>2</sub> > Adj<sub>1</sub> > N      0  
 c. N > Adj<sub>1</sub> > Adj<sub>2</sub> > Adj<sub>3</sub>      Irish, Welsh, Nawdm . . .<sup>27</sup>  
 d. N > Adj<sub>3</sub> > Adj<sub>2</sub> > Adj<sub>1</sub>      Arabic, Indonesian, Yoruba, . . .
- (29) a. Adv<sub>1</sub> > Adv<sub>2</sub> > Adv<sub>3</sub> > V      English, Chinese . . .  
 b. \*Adv<sub>3</sub> > Adv<sub>2</sub> > Adv<sub>1</sub> > V      0  
 c. V > Adv<sub>1</sub> > Adv<sub>2</sub> > Adv<sub>3</sub>      (Main clause) German . . .  
 d. V > Adv<sub>3</sub> > Adv<sub>2</sub> > Adv<sub>1</sub>      Malagasy, Niuean . . .

- (30) a. Aux<sub>1</sub> Aux<sub>2</sub> Aux<sub>3</sub> V Italian, English . . .  
 b. \*Aux<sub>3</sub> Aux<sub>2</sub> Aux<sub>1</sub> V 0  
 c. V Aux<sub>1</sub> Aux<sub>2</sub> Aux<sub>3</sub> Hungarian  
 d. V Aux<sub>3</sub> Aux<sub>2</sub> Aux<sub>1</sub> Hungarian, German . . .
- (31) a. IO > DO > V (Eseejja, Kapau, Kewa, Maranungku, Mundari, Telefol . . .)  
 b. \*DO > IO > V<sup>28</sup> (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):<sup>29</sup>





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).<sup>30</sup>

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.<sup>31</sup>

- (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 Freitag<sup>32</sup>  
 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