COMPLEMENT AND ADVERBIAL PPs: IMPLICATIONS FOR CLAUSE STRUCTURE
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The syntax of adverbial PPs presents 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) [I [$_{VP}$ [$_{VP}$ [$_{VP}$ discussed the problem] with John] on Monday]]

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) [I [$_{VP}$ discussed [$_{VP}$ the problem t$_V$ [$_{VP}$ with John t$_V$ [on Monday]]]]]

Among the phenomena favoring (1) are:

A) **the apparent lack of Principle C effects** between the direct object and an R-expression contained in the adverbial PP (*They killed him$_k$* [*on the very same day John$_k$ was being released from prison*]). This is expected under (1), but not under (2).

B) **constituency diagnostics**, which single out the V and the object as a constituent, stranding the two PPs (*..and discuss the problem he did with John on Monday*), or the V, the object, and the first PP, stranding the second (*..and discuss the problem with John he did on Monday*), or the whole sequence (*..and discuss the problem with John on Monday he did*), but crucially not the two PPs alone (**It's with John on Monday that he discussed the problem*), nor the object plus the two PPs (**It's the problem with John on Monday that he discussed*). Again, this is expected under (1), but not under (2).

C) **the relative scope of VP-final PPs**, which typically has the PP on the right take scope over the PP on the left (*John smoked in the car because of the rain*). Under the standard assumption that scope is defined in terms of c-command, this is expected under (1), but not under (2).

Other phenomena, however, appear to go in the opposite direction, favoring (2) over (1); among these: **the binding of anaphors, the binding of pronouns (by quantifiers), and the licensing of negative polarity items** (NPI). See the contrasts in (3)/(4)/(5), respectively:

(3)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
(4)a Gidon Kremer performed in *every Baltic republic* on *its* independence day (Pesetsky 1995,161)
   b *He spent many hours in *its* memorial on *every independence day*
(5)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 (3)/(4)/(5) are expected under (2), but not under (1).

Adding further to the paradox is Pesetsky's (1995,172ff) observation that the objects of the PPs in (3)/(4)/(5) appear to c-command *out of* the PPs.

Pesetsky's own solution to the paradox (and to the c-command puzzle) is to assign sentences with adverbial PPs two parallel structures. One like (1) (what he calls "layered structure"), which is 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 calls a "cascade structure"), which is 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 however like to propose a "serial", rather than a "parallel", solution to the paradox.

The first step is the observation that complement and adverbial PPs are not freely ordered (as is already evident from the asymmetries in (3)/(4)/(5), and others that will be presented).

The second step consists in determining the order of merge of complement and adverbial PPs.

Converging evidence for determining it comes from two separate domains. The first is the question which PPs can, and which PPs cannot, be stranded under VP-preposing (only PPs merged higher should be able to get stranded when a lower PP is carried along under VP-preposing – Nilsen 1998). The second is a typological left-right asymmetry. It so appears that the order of adverbial PPs to the left of the V is unique (e.g. Temp > Loc > P_{DAT}), while the order to the right of the V is not. It is either the same, or its exact opposite (P_{DAT} > Loc > Temp): an asymmetry reminiscent of those characterizing adverbs in the clause (Cinque 1999,43), and the nominal modifiers in the DP, Demonstratives, Numerals and Adjectives, and Adjectives among each other (Cinque 1996,2000). This is shown, in a particularly clear way, by the microvariation found within the Germanic family (but a. is true of OV languages in general; b. of VO Czech; c. of VO Romance, etc.):

a. Temp > Loc > P_{DAT} > V   (German and Dutch subordinate clauses)   (Haider 2000)
b. V > Temp > Loc > P_{DAT} (German and Dutch main clauses)
c. V > P_{DAT} > Loc > Temp   (English, and the Scandinavian languages) (Nilsen 1998)

Dutch actually has both the German and the English/Scandinavian orders (Koster 1974,2000; Barbiers 1995).

What we claim is that no Germanic language (or any other language, for that matter) should allow the order P_{DAT} > Loc > Temp > V.

The asymmetry appears derivable from a unique order of merge (Temp > Loc > P_{DAT} > VP), and the two possible ways in which the (remnant) VP may successively raise: either pied piping the immediately dominating phrase (with the effect of reversing the order of merge, to give V > P_{DAT} > Loc > Temp), or not pied piping it (thus hopping around the adverbial PPs and preserving the order of merge). (On the more general validity of this parameter, see Koopman and Szabolcsi 2000).

(1) (of English, Scandinavian,etc.), which captures the properties listed in A,B,C above, is thus *a derived structure*. What about the binding of anaphors, pronominals, and NPIs (in English), which appeared to be incompatible with (1)? We will argue that they can be captured on a structure intermediate between the merge structure and the derived structure (1). If we assume, after Kayne (2000, 2001), that prepositions are not merged with their (ultimate) complement, but are merged in higher AgrPs, it becomes possible, before the roll-up derivation, 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 AgrP (in a structure which is essentially a (reverse) cascade structure).

It actually appears, from the VP-preposing diagnostic and the left-right asymmetry diagnostic just mentioned, that not only time, place, and dative PPs are hierarchically ordered with respect to each other, but that also purpose, cause, benefactive, comitative, instrumental, manner, etc. PPs are, and that their order matches (in a mirror-image way) that of the corresponding derivational suffixes of languages like Fula/Fulfulde.

If these conclusions are correct, a partially new light is shed on the universal structure of the lower portion of the clause. It too appears to be hierarchically structured; more rigidly, in fact, than it is generally thought.

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