Adverbs: The Hierarchy Paradox.

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1. Adverbs and phrase structure

On the basis of an impressive cross-linguistic survey, Cinque (1999) suggests that the relative ordering of adverbs in a clause is determined by a universal hierarchy and proposes that this hierarchy is itself unambiguously determined by phrase structure, with the adverbs occupying unique specifiers of functional projections. It is shown here that the proposal that the adverb ordering hierarchy follows directly from phrase structure leads to a paradox on the (standard) assumption that phrase structure is two-dimensional. In section 2, I present the relevant premises in schematic form. In sections 3-4, I fill in the schema, showing that a paradox is derived regarding the relative orders of adverbs and verbal elements. In section 5, I show that the same paradox emerges concerning the order of adverbs and DP-related positions. In the conclusion, I suggest that in order to maintain the view that hierarchies are configurationally represented, one alternative is to invoke multi-dimensional representations.

2. The argument

Cinque's empirical argument for locating adverbs in specifier positions is that there is "one head position to the immediate left and one head position to the immediate right of each AdvP" (p.45). Schematically, the argument is as follows. Given two elements of similar category (call them A and B) we observe an immutable order: A»B (i.e., A precedes B). Taking a third element ("C") we find the following orders possible: C»A»B, A»C»B, A»B»C. All other permutations are ungrammatical. Cinque compares two approaches to such a situation, which he labels Alternative I and Alternative II.

> Alternative I (Cinque's own proposal, see also Alexiadou 1997) takes it to be the case that items A and B occupy fixed positions in the clausal architecture, with C moving upwards to landing sites below, between or above A and B. The impossibility of B»C»A, B»A»C and C»B»A follow directly from the phrase structure assumed.

> Alternative II (roughly that put forth by Ernst 1997, Shaer 1997 and elsewhere) is that there is an abstract ordering principle, that holds across positions, requiring A»B, but that this is not directly encoded in the hierarchical order of functional projections.

   Cinque rejects Alternative II essentially on the grounds of parsimony, arguing that Alternative I needs fewer assumptions; Alternative I has just phrase structure, but Alternative II has phrase structure **plus** the ordering principle (see Cinque, p. 47 and p. 184, n.6). The examples we turn to presently are exactly those which Cinque offers in support of Alternative I. I will argue here that they in fact undermine it, unless syntax is multi-dimensional, in a manner analogous to autosegmental phonology.

3. The data: Adverbs and verbal heads

Cinque's initial argument is established on the basis of the relative ordering of adverbs and verbal heads (including finite verbs, auxiliaries and past participles). These are shown to fit the schema of the argument above, with A,B = adverbs, and C = verbal element.

(Cinque argues that many apparent counter-examples to his proposed hierarchy arise as the result of either subtle variations in the meaning of the adverbs [lexical ambiguity], correlating with different positions, or movement of the adverbs or of projections containing them, or by other means [chapter 1]. For the sake of the discussion, I accept Cinque's arguments regarding absolute adverb order and the examples that establish it, though for the record, there is some controversy here; see, e.g. Ernst 1997, Williams 1998.)

To illustrate the argument, Cinque notes (p.47) that in Italian, either *mica* 'not' or *più* 'any longer' may either precede or follow a past participle, as in (1).

(1) a. Non hanno *mica/più* **mangiato**.
     b. Non hanno **mangiato** *mica/più*.
         NEG they-have not / any.longer eaten not/any longer.
         'They haven't eaten (any longer).'   (Cinque 1999, 47)

Moreover, the two may cooccur together on either side of the participle, or straddling it with *mica* preceding and *più* following:

(2) a. Non hanno (*mica più*) **mangiato** (*mica più*).
     b. Non hanno *mica* **mangiato** *più*.
         NEG they-have not / any.longer eaten not/any longer.
         'They haven't eaten (any longer).'   (Cinque 1999, 47)

However, regardless of their positions with respect to the participle, the order of the adverbs *mica* and *più* relative to one another is fixed, as shown in (3).

(3) a. *Non hanno *più mica* **mangiato**..
     b. *Non hanno **mangiato** *più mica*.
     c. *Non hanno *più* **mangiato** *mica*.
         NEG they-have any.longer (not) eaten (any longer) not.
         'They haven't eaten (any longer).'   (Cinque 1999, 47)

This neatly fits the schema above. The overall order of A (*mica*) is fixed relative to B (*più*), even when they are not adjacent, but the order of C (*mangiato*) relative to these two items is free. The conclusion is that the order of the adverbs follows directly from the phrase structure (via the independent ordering of the functional heads in whose specifiers Cinque takes the adverbs to reside) while the participle is free to undergo head movement to any of the various heads hosting the adverbs. Thus, the analysis attributed to (2a) on his analysis would be (minimally) (4), with other grammatical examples above corresponding to the participle surfacing in lower (trace) positions. (The past participle may occur even higher, see p45 (1a)).

(4)   [non hanno   [$_{FP}$ mangiato$_i$ [$_{micaP}$ mica t_i [$_{piùP}$ più t_i [$_{VP}$ t_i]]]]

4. The paradox I: Verbal heads and adverbs

The examples Cinque considers involve the possible relative orders among two adverbs and a (perfect) participle. As Cinque notes, though, the (observed) position of the auxiliary is also not invariant in such examples. In particular, the auxiliary may occur lower than many adverbs, and significantly, lower than adverbs such as *mica*, which, as we have just seen, may follow the participle. The following is a relevant example (for others, see Cinque 1999).

(5)   Gianni purtroppo   forse   stupidamente *mica* **gli ha**   più   telefonato.
      G.   unfortunately perhaps stupidly   not   to-him has any longer telephoned.
                                                                     (Cinque 1999, 51)

   If the adverbs indeed occupy a fixed position, then we conclude that the auxiliary may occur lower than the highest position which the participle comes to occupy. [Note that Cinque (pp. 50-51) discusses the restrictions regarding the cooccurrence of *mica* and sentential negation *non*, arguing that *mica* occupies the same, fixed position in all examples here.] The auxiliary follows *mica* in (5) and the participle precedes *mica* in (1b). On the assumption that the "lowest" attested position of the auxiliary is its base position (or higher), then the structure of (2a) in (4) must be updated to include a trace of the auxiliary below *mica*. Regardless of the exact position of the trace, the derivation in (6) involves a violation of the Head-Movement Constraint.

(6)   [non hanno   [$_{FP}$ mangiato [$_{micaP}$ mica t_{AUX} t_{PART} [$_{piùP}$ più t_{PART} [$_{VP}$ t_{PART}]]]]

   Importantly, despite the fact that the auxiliary may follow *mica* and that the participle may precede *mica*, the gross relative order of the auxiliary and participle is fixed. Regardless of the position of these elements relative to the adverbs, the auxiliary must precede the participle.

(7)   a.   *Gianni stupidamente **telefonato**   *mica*   **gli ha**   *più*.
           G.   stupidly   telephoned   not   to-him has any longer.

      b.   *Gianni stupidamente **telefonato**   **gli ha**   *mica*   *più*.
           G.   stupidly   telephoned   to-him has   not   any longer.

      c.   *Gianni stupidamente *mica*   **telefonato** **gli ha**   *più*.
           G.   stupidly   not   telephoned   to-him has any longer.
                     (Mario Fadda, Michela Ippolito and Lara Riente, personal communication, 7/99)

   We have now reproduced the schema from section 2, using a different assignment of values to A,B and C. In particular, we take the case where A and B are verbal elements (the auxiliary and participle, respectively), and C is an adverb, say *mica*. The auxiliary (A) and participle (B) may both occur to the left of the adverb (C) (1b), or they may both occur to the right of the adverb (5), or they may flank the adverb (2b). Yet alternative orders in which B precedes A are ungrammatical (7). By Cinque's argument (Alternative I), it follows that the verbal elements (auxiliary and participle in this case) occupy fixed positions in the phrase structure representation, while the adverb is free to move among them.

There are numerous ways to enrich the mechanics of the theory to try to avoid this paradox. Such enrichments, however, undermine the parsimony argument, and amount to Alternative II. For example, one possibility (suggested by G. Cinque and C. Laenzlinger, in responses to a draft of this squib) is to invoke a stipulation to the effect that (certain) moved elements may leapfrog over one another, but the end result must be isomorphic to the base order (as Cinque himself notes, it is not clear how to restrict this to the cases at hand, given that movement inverting the base order undeniably exists). Such an isomorphism principle is straightforwardly incompatible with the claim that "Alternative I needs nothing special to account for [(3c)], as it simply offers no way of deriving [(3c)]." (Cinque 1999:47). Recall that the argument for Alternative I is that Alternative II is a "supplement" to the theory and that no such independent ordering principles should be invoked. Thus, Cinque 1999:47 rejects Alternative II primarily on the grounds that any extrinsic principle "simply recapitulates the ordering principle needed to account for the orders possible" when C is not between A and B, a characterisation that would clearly apply to an isomorphism principle. Similar considerations would apply to proposals involving movement of the adverb, or of projections containing it: to the extent that they are constrained to exclude unattested orders, the required constraints go beyond Alternative I, which is at its core, the hypothesis that the adverb orders are the direct result of their phrase structure positions.

5. The paradox II: DP-related projections

The paradox is replicated in an examination of the relative orders of DPs and adverbs in Chapter 5. Though the paradigms given here are not as complete as in section 3, Cinque's most extensive relevant discussion comes from the positions of floating quantifiers which he takes to be a special case of DPs, occurring in DP-related projections. I have given arguments elsewhere (Bobaljik 1998) against the position that floating quantifiers [FQs] are associated with the trace of the DP they quantify over, but the issue is not directly relevant; Cinque has established quite clearly that floating quantifiers do not fit into the hierarchy he has carefully established for other adverbs, but that they do obey their own hierarchy (pp. 116-118).

On the basis of examples such as (8), Cinque argues that FQs move through projections interspersed among the fixed adverbial projections established previously.

(8) a.   Han   rifatto   (tutti) sempre (tutti) completamente il loro compito.
            'They.have done.again (all)   always (all)   completely   their homework.'

     b.   Li ha   rifatti   (tutti) sempre (tutti) completamente bene.
            'CL-has   done.again (all)   always (all)   completely   well.'

     c.   Ha   (loro)   sempre   (loro)   spiegato   tutto.
            'He.has   (to-them)   always   (to-them)   explained   everything.'
                                                                          (Cinque 1999:120)

For example, the subject FQ in (8a) may precede the adverbs *sempre* 'always' and *completamente* 'completely' or occur between them. The same is true of the object FQ in (8b), and apparently of the dative weak pronominal *loro* in (8c), which Cinque treats together with FQs (p.117, citing Cardinaletti 1991). The arguments in this section follow the schema outlined

above, with A=*sempre*, B=*completamente* and C=FQ. He concludes that FQs raise among the fixed adverbs.

Regarding the relative positions of the FQs themselves, Cinque (pp. 116-118) establishes that there is an invariant order in Romance $FQ_{SUBJECT} > FQ_{INDIRECT.OBJECT}/loro > FQ_{DIRECT.OBJECT}$. This order is apparently fixed regardless of how these are interspersed among the adverbs. This allows examples similar to (8) to be reinterpreted as involving $FQ_{SUBJECT} = A$, $FQ_{OBJECT} = B$ and *sempre* = C. The fixed order of the FQs relative to one another, and the variable positioning of the adverb with respect to the FQs, forces (on Alternative I) the conclusion that the FQs (or DP-related projections more generally) occupy fixed positions determined by properties of phrase structure, and that adverbs such as *sempre* achieve their relative freedom via movement. This of course is the opposite conclusion to that drawn by Cinque, and since the same logic applied to the same examples forces opposite conclusions, the paradox is once again derived.

6. Conclusion

The considerations here do not militate directly against an overall, hierarchical ordering of adverbs, perhaps derived from phrase-structure considerations. However, it is clearly impossible to maintain that the internal ordering of adverbs, that of heads and arguments, and the ordering of the groups with respect to each other, all follow directly from a single phrase-structure representation. Any such account must be supplemented minimally by displacements that may violate strict locality constraints (i.e., crossing paths must be tolerated), in tandem with an independent stipulation to preserve the original word order. One may argue that this is not implausible (indeed, such constraints have been proposed), but invoking such constraints amounts to Alternative II—an extrinsic principle which recapitulates the order putatively arising from phrase structure—and there is no longer an argument from parsimony in favour of Alternative I.

Examining the general picture, the effect given by the data is one of multiple hierarchies (at least, perhaps at most, two) interleaved among one another. One might draw an analogy to the shuffling together of two decks of cards, which preserves the internal order of each deck, but intersperses the cards of each deck among those of the other. It is exactly this interleaving effect that I would suggest here is evidence of a separate, but intrinsically ordered, tier on which adverbs occur, ultimately collapsed together with the argument/head tier by a form of tier conflation (see van Riemsdijk 1998 for recent discussion of multi-dimensional structures, and for a sampling of recent proposals: Moltmann 1992, Chametzky 1996, Åfarli 1998, Martin & Uriagereka 1999, and Wilder 1999). Such a proposal escapes the paradox problem, while accepting the premise that all hierarchies should be encoded by the same formalism, *viz.*, phrase structure, a premise familiar from work in Theta-Theory. (This characterises, for instance, the strong UTAH, i.e., attempts to reduce the thematic hierarchy to unique phrase structure positions corresponding to different theta-roles, see Baker 1997 for discussion.) Cinque and others have recently embraced this direction in attempting to account for the hierarchical ordering of adverbs. As demonstrated above, accepting this premise leads one inescapably to a multi-dimensional theory of phrase-structure in which the principles ordering adverbs occupy a different plane than those ordering verbal elements and arguments.

7. References

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