Adverbials, Functional Structure, and Restrictiveness

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A long-standing puzzle in the generative literature has been that of the nature of restrictions governing adverb distribution. These restrictions, which pertain both to the positions in which a given adverb is licensed and to its coöccurrence with other adverbs, are illustrated in 1–2 below:

(1)   a.   Bill has probably completely destroyed the evidence.
          b. * Bill has completely probably destroyed the evidence.

(2)   a.   (Probably) she (probably) has (probably) been (*probably) sleeping
             (*probably).
          b.   (Frequently) she (frequently) has (frequently) been (frequently) sleeping
             (frequently).
          c.   (*Soundly) she (*soundly) has (*soundly) been (soundly) sleeping
             (soundly).   (Ernst 1997, (4))

One possibility for analysing such restrictions, recently pursued by Alexiadou (e.g. 1997) and Cinque (1996), has been to take adverb position to be a direct reflection of clausal structure. On this analysis, different classes of adverbs form AdvPs that are the specifiers of different functional projections, which have a single hierarchical ordering cross-linguistically. A rather different alternative to this 'monolithic' functional category (FC) approach is the 'modular' one advanced by Jackendoff (1972), McConnell-Ginet (1982), Ernst (1984), and others, according to which the distribution of adverbs is determined by various linguistic factors, both semantic and syntactic.

Now, since a chief virtue claimed for the former approach is its restrictiveness, it is worth considering this matter more closely. As Baker (1991: 387) and others have noted, there is a tension in linguistic theory between the imperative of 'mak[ing] available a suffi-

ciently rich array of desriptive sources to allow a revealing description of any human language' and that of 'mak[ing] sure that the descriptive options allowed in the theory are sufficiently restrictive.' Alexiadou's and Cinque's analyses clearly restrict the kinds of positions that adverbs may occupy, by taking each adverb in the verbal domain to be the sole left-peripheral specifier of some functional projection, in accordance with Kayne's (1994) so-called 'antisymmetry' theory of phrase structure. Yet it is not obvious that this approach to adverbs provides the most plausible or best motivated account of their behaviour.

What I hope to show here is that this approach, in fact, faces serious conceptual and empirical difficulties, and misses important distributional generalizations that cut across syntactic categories. A 'modular' approach, in contrast, can avoid these difficulties by viewing the positions that adverbs occupy as arising from the interaction of their lexical properties with syntactic and semantic principles; and by locating the source of commonalities between adverbs and other categories in the lexicon. The particular version of this approach that I shall be sketching here takes the distribution of adverbs to be constrained by properties of phrase structure, but more fully determined by the argument structure of adverbs and verbs, an operation of 'coercion' that applies to the former (e.g. Pustejovsky 1995), and the scopal relation of one adverb to another. Accordingly, the position that a given adverb occupies is a derived rather than basic property of the adverb.

In what follows, I shall be focussing on Cinque's rather than Alexiadou's analysis, and on certain of its basic claims, rather than on the specific claims that Cinque makes about adverbs in Italian and French, despite their prominence in his discussion. While these decisions have been dictated in part by considerations of space, they also serve to highlight Cinque's more explicitly 'universalist' claims about adverbs and the question of whether adverb distribution across languages is plausibly handled in terms of a single hierarchy of FCs. Because Cinque's and Alexiadou's analyses do, however, have the same basic goal — namely, to unify the analysis of adverbs and verbal FCs —, my remarks can be seen to apply to each of them.

1.   Cinque's Proposal

Let us turn, then, to the basic claim of Cinque's analysis. This is that there is a universal hierarchy of clausal functional projections of V, including several distinct projections for mood, modality, tense, aspect, and voice. Given the well-established assumption that different adverb classes have different base-generated positions (e.g. Jackendoff 1972; Travis 1988), an hypothesis that emerges naturally from this claim and Kayne's (1994) view of phrase structure is that adverbs 'are the overt manifestation of (the specifiers of) [these] functional projections, which in certain languages may also manifest themselves via overt material in the corresponding head positions' (Cinque 1996: Introduction). Cinque argues for a universal hierarchy of clausal functional projections by relating the ordering of adverbs to that of modal, temporal, aspectual, and voice markers across languages. The result is a very neat picture of adverb distribution.

2. Some Problems with Cinque's Analysis

However, as Alexiadou admits at the end of her own (1997) study, the picture of adverbs that emerges on this FC approach seems almost too neat. One reason for doubt is that adverbs themselves do not seem nearly so well behaved, but rather exhibit syntactic

and semantic quirks of various kinds. Another is that the close correspondence between FCs and adverbs basic to this picture has little direct support. This is not only because languages, as Cinque (1996: §4.30) himself notes, generally display a variety of adverb classes far greater than that of the functional heads purported to correspond to them, but also because adverbs 'can modify so many different kinds of semantic objects, and... can occur so freely in a sentence' (Ernst 1984: 307); so that an analysis of adverbs that attends only to their appearance in the verbal domain presents a rather distorted picture of them.[1] As it happens, closer examination of the FC analysis of adverbs reveals many weaknesses which lend credence to these and other suspicions about this picture.

Perhaps the most obvious concerns the restrictiveness of the FC approach itself. While this account does restrict possible positions for the base-generation of adverbs, as just noted, it appears to abandon this restrictiveness elsewhere — vastly enriching the syntax by proliferating verbal FCs, and offering no principled means to restrict this number. Cinque's analysis itself posits 28 heads; but, as Ernst (1997) shows, even more would be required to capture the positions of other attested classes of adverbs. If such an approach is to have any empirical teeth, then we must be able to determine this number with some accuracy — particularly given Cinque's 'universalist' claim that both the number and type of FCs are invariant across languages. Unfortunately, there are many obstacles to doing so, as we shall see in the following sections.

2.1. Functional and Lexical Categories

One is related to the 'functional' status that Cinque assigns to a range of elements across languages, this status being central to the support that these elements provide for a universal inventory of FCs. As it happens, this functional status is in many instances forced by the analysis, which, as noted, does not allow for the possibility that languages differ in their inventories of FCs. What is problematic here is that Cinque offers no independent criteria to confirm this functional status, even though many of these elements are more plausibly analysed as lexical. One salient example of this is modal forms. Though Cinque treats these as invariantly functional, many authors have argued that, for example, German modal forms behave more like main verbs in many respects than do their English counterparts (see e.g. Rowe 1994: 68–71). However, even English modals, as Warner (1993: 41) points out, have the kinds of idiosyncratic semantic and morphosyntactic properties that suggest that they have '"drifted off" from a motivating rule', and now have the status of lexical rather than inflectional elements. In fact, the assumption that modals, like other auxiliaries, are generated under V has proven fruitful in many recent analyses of these forms (see e.g. Baker 1991: 392–95; Ernst 1991).

A lesser-known instance of apparently functional elements that are more plausibly analysed as lexical is that of the temporal affixes of West Greenlandic (WG) and other Inuit languages, as illustrated in 3:[2]

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[1] A similar point is made in McConnell-Ginet 1982: 147.

[2] The following abbreviations appear in the WG glosses: (moods) cond = conditional, ind = indicative; (cases) rel = relative (absolutive), erg = ergative, loc = locative; (other) fut = future, 1/2 trans = half-transitivizer, iter = iterative, perf = perfect, pl = plural, and s = singular. For reasons of space, Fortescue 1980 and 1984 are cited in examples as F80 and F84, respectively.

(3)   a.   Nuum-miis-sima-vunga.
             Nuuk-be.in-perf-ind.1s
             'I have seen Nuuk.'

       b.   tuqu-ssa-atit.
             die-fut-ind.2s
             'You will die (e.g., if you drink the poison).'   (F84: 272, 274)

While examples like those in 3 suggest that past markers like *sima* and future markers like *ssa* are simply tenses, closer examination reveals many properties that are at odds with such an analysis. Among them is the optionality of past markers on verbs describing past situations, the lexical properties of the verb stem, independent temporal adverbials, or context being sufficient for reference to a past time (Fortescue 1984: 272):

(4)   a.   aggir-puq
             come-ind.3s
             'He is/was coming.'   (ibid.)

       b.   juuli-up   aappa-a-ni   Nuum-miip-punga.
             July-erg   second-its-loc   Nuuk-be in-ind.1s
             'I was in Nuuk on the second of July.'   (ibid., 273)

Moreover, while future markers are obligatory in sentences describing future situations, the fact that markers of repeated action are similarly obligatory in descriptions of the relevant kind points to a non-grammatical requirement for these markers, rather than an inflectional status for either:

(5)   nalunaaqutta-p   akunnir-a-ni   quirsur-tar-puq
       clock-rel   (space-) between-its-loc cough-iter-ind.3s
       'He coughed (repeatedly) for an hour.'   (ibid., 283–84)

        This view of future markers is supported by various parallels between them and past markers. These include the ability of each to appear in different positions on the verb, and distinct from the markers generally recognized as those of verbal inflection, as shown in 6 (cf. 3); their failure to be repeated on otherwise fully inflected verb forms in subordinate and coördinate clauses, as shown in 7 (Fortescue 1984: 273); and the existence of various markers of past and future, each with distinct lexical properties (ibid., 272–75).

(6)   a.   ungasiq-niru-laar-tsiar-ssa-qquur-qi-vuq
             be far-more-a little-somewhat-fut-undoubtedly-!-ind.3s
             'It will undoubtedly be somewhat further off.'   (F80: 259–60)

       b.   allattu-i-vvi-ssaaliqi-sar-sima-qa-anga
             write down-1/2 trans-place-lack-iter-perf-very-ind.1s
             'I was really short of note-books'   (F84: 316)

(7)   a.   titar-niqar-sima-vuq   sana-niqar-luni=lu
             design-pass-perf-ind.3s   build-pass-cont.4s=and
             'It was designed and built (at some earlier time).'   (ibid., 273)

b.   aavir-suaq   aqqa-raluar-luni   tuqu-lir-luni   pui-ss-aq
     walrus-big   dive.down-but-cont.4s   die-begin-cont.4s   surface-fut-ind.3s
     'The big walrus, though it has dived down, will come up to the surface
       dying.'   (ibid., 301-2)

Such data, as I have argued elsewhere (see Shaer 1998), suggest an analysis of temporal affixes in WG as bound adverbs. Whether or not these affixes turn out to be best analysed in this way, it is clear that they, like many modal forms, have many properties that receive no satisfying explanation on a functional analysis. Moreover, to the extent that these affixes can be analysed as adverbs, they are especially problematic for Cinque's claim that adverbs are always the specifiers of particular functional projections. This is simply because their status as the specifiers or the heads of such projections accordingly becomes a moot one, and the complementarity that we have found between them and adverbial XPs in sentences like that 6b receives no explanation. In sum, by stipulating a uniformly functional status for a range of temporal, modal, aspectual, and other markers, an analysis like Cinque's leaves itself with few means to explain the well-attested differences in their properties cross-linguistically, and has no alternative but to deny the significance of these differences.

2.2.   Position, Meaning, and Other Categorization Conundrums

A second difficulty with Cinque's account pertains to the relation that he posits between adverb positions and interpretations: namely, 'one specific, and distinct, interpretation for each position of "base generation"' (Cinque 1996: §1.6). What this means in Cinque's system is that if a given adverb appears in more than one position, it is taken to be base-generated in each only if it receives a distinct interpretation there, and otherwise to have moved to this position or to have had some other element move around it. While the claim for such a close correspondence between position and interpretation is a useful tool in investigating adverb behaviour, it is far from unproblematic.

This becomes clear once we trace the implications of this claim for various classes of adverbs. Consider, for example, how this claim applies to the set of adverbs, exemplified below, that appear both VP-internally and VP-externally:

(8)   a.   John has answered their questions cleverly.
        b.   John has cleverly answered their questions.   (Cinque 1996: §1.4, (83a, c))

(9)   a.   John intentionally knocked on the door twice.
        b.   John knocked on the door twice intentionally.   (ibid., (113))

These two occurrences of adverbs are commonly assigned two quite different analyses, VP-internal occurrences restricting 'the range of events referred to', and VP-external occurrences 'tak[ing] verbal reference for granted and saying something about the event or situation' (McConnell-Ginet 1982: 159). On Cinque's account, however, only *cleverly* is associated with these two different readings — a 'manner' reading (according to which John answered the questions in a clever manner) in 8a and a 'subject-oriented' reading (according to which it was clever of John to answer the questions) in 8b — and accordingly base-generated in two different positions. In contrast, *intentionally* is taken to receive the same reading in both positions, and thus to be base-generated only preverbally, with the constituent [knocked on the door twice] moving around it in 9b (Cinque 1996:

§1.4). What might strike us as curious about this analysis is that its only evidence for a significant structural distinction between these pairs of sentences is the availability of distinct 'higher' and 'lower' readings for the adverbs that appear in them, even though the nature of the difference between these readings as they apply to particular adverbs is, as it happens, often far from clear. The adverb *intentionally* itself furnishes a good example of this difficulty. Given that intentions are not inspectable, it seems just as reasonable to say that the difference between 'manner' and 'subject-oriented' readings is more or less neutralized in this case — in other words, that there is little difference between asserting that John's knocking twice was an intentional act and that the manner in which he knocked indicated that it was intentional — as to say that the adverb has only one reading. (We shall be returning to this matter in §3.)

Significantly, this difficulty is associated not only with adverbs like those that we have just examined, whose contributions to the meaning of a given sentence are not easy to characterize, but is a surprisingly common part of describing the interaction even of manner adverbs like *quickly* and *slowly* with particular predicates. This is suggested by the following examples:

(12)   a.   John quickly walked to the store.
        b.   John walked to the store quickly.
        c.   He slowly tested some bulbs.   (Thomason & Stalnaker 1973: 200, (16))

(13)   a.   He tested the bulbs slowly.
        b.   He changed the light bulbs slowly.

(14)   a.   John climbed quickly up the tree.
        b.   John went to the store quickly.

These examples bear out a much more complex interaction between position and interpretation than that indicated by Cinque's analysis. In addition to those readings consistent with this analysis, as illustrated in 12 — adverbs in the 'higher' position receiving a reading according to which they 'operate' on the entire event, those in the 'lower' position receiving the 'manner' reading described above — both 'event' and 'manner' readings appear to be available to 'lower' adverbs with some predicates, as suggested by the sentences in 13; and 'event' readings even seem preferred with others, as suggested by those in 14. This reveals Cinque's strategy of relating the position and interpretation of adverbs to be a problematic one: not only does it preclude the drawing of plausible parallels in the syntactic status of adverbs, but it also proposes significant differences between adverbs based solely on uncertain intuitions about their meaning. At the same time, it offers no ready means to relate the different readings of particular adverbs, making it essentially a coincidence that these have multiple base positions while other adverbs do not.[3]

Other instances of adverb behaviour that do not sit well with Cinque's assumptions are those related to the respective positions and interpretations of adverbs such as *probably* and *already*, as illustrated in 15:

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[3] The problem of 'accidental homonymy' is one that has long plagued analyses of adverbs that may appear in different positions. See e.g. McConnell-Ginet 1982: 157 for discussion.

(15)　a.　John probably already left.
　　　b.　John already probably left.

These two sentences appear to have the same interpretation: namely, that it is probably the case that John already left. On Cinque's assumptions, one of these sentences would thus have to be analysed as reflecting the base position of these adverbs, with the other derived from it by movement of some constituent. Of course, the only motivation for doing so would be the unavailability of different base positions for these adverbs, since in Cinque's system an adverb that receives the same reading in two positions cannot be doing so in different base positions. This assumption is, of course, a common one in the generative literature, underlying, for example, Sportiche's (1988) analysis of the sentences in 16:

(16)　a.　The students all left.
　　　b.　All the students left.

Sportiche assigns these sentences the same logical form because they predicate the same thing about some set of students. Yet such an approach fails to appreciate the fact that two formulas can differ structurally while still being logically equivalent — precisely the result obtained in Dowty & Brodie's (1984) analysis of these sentences as involving quantification over VP denotations and NP denotations, respectively. What this means is that the strategy of capturing identical interpretations uniformly in terms of identical syntactic structures is not an entirely adequate one.

As it happens, there is even a significant complication for the claim that movement of an adverb from its base position to a 'higher' one can serve to capture identity of readings associated with an adverb in different positions. The complication is illustrated in 17, in which topicalized (and thus on standard assumptions moved) AdvPs appear to receive additional semantic properties in this operation (see Bellert 1977: 346), resulting in the unacceptability of 17a′ and 17b′ (cf. 18):

(17)　a.　　John probably never/rarely ran so fast.
　　　a′.　* Never/Rarely did John probably run so fast.
　　　b.　　John probably ran so fast that he got to Texas in ten minutes.
　　　b′.　* So fast did John probably run that he got to Texas in ten minutes.

(ibid., (30)–(33))

(18)　a.　　He was already badly treating his assistant.
　　　b.　* He was badly already treating his assistant.
　　　c.　　How badly was he already treating his assistant?　　　(Cinque 1996: §1.5)

Just how this difference between topicalized and questioned AdvPs should be captured is an open question. What it does suggest, though, is that identity and non-identity of adverb readings do not correlate as closely with derived and non-derived positions as Cinque's analysis assumes.

Thus, Cinque's analysis, in taking the base positions of adverbs to be determined by a clause's functional structure, and in determining these positions on the basis of highly problematic assumptions regarding the relation between position and interpretation, presents us with a view of adverbs which, from both theoretical and empirical standpoints, is far from satisfying. The difficulties that we encountered in assessing Cinque's claims about particular adverbs highlights the shortcomings of his strategy of rigidly categorizing ad-

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verbs in phrase-structural terms, guided in many cases only by weak intuitions about their meanings. Such a rigid categorization of adverbs is also at odds with the interspeaker variation and acceptable deviance that we find with respect to the position of particular adverbs, which the FC approach has no obvious means of capturing.[4] Significantly, these difficulties are all ones that a child would face in attempting to 'match' the meanings of particular adverbs with their base positions — a task vastly complicated by the fact that the position in which the child hears a given adverb may or may not be its base position, and the distinction between its interpretation in one or another base position may be negligible, or simply obscured by context or other factors (on this, see e.g. Ernst 1984: 80). This monolithically syntactic approach to adverb distribution thus seems to falter on learnability grounds, too.[5]

2.3.   The 'Division of Linguistic Labour'

A third problem with the FC approach to adverb distribution pertains to its ability to generalize to distributional facts about other categories as well as to a broader range of such facts about adverbs themselves. Since a key motivation of such 'monolithic' accounts of linguistic phenomena is to alter the 'division of linguistic labour' by bringing a given phenomenon within the purview of syntactic explanation, one test of their success is whether they achieve an appropriate level of generality in doing so, or simply lead to a duplication of explanation for analogous phenomena elsewhere in the grammar. On this test, the FC approach performs rather poorly. Conspicuously, its use of 'dedicated' functional structure to capture the distribution of adverbs does not readily extend to the analysis of largely identical restrictions on the order of NPs and of adjectives in NPs and multi-clausal structures, as demonstrated in the contrast between the (a) and (b) sentences below:

(19)   a.   the probability of the quickness of the destruction
        b. * the quickness of the probability of the destruction

(20)   a.   the probable quick passing of the bill
        b. * the quick probable passing of the bill

(21)   a.   It is lucky for us that it is probable that it is easy for John...
        b. * It is probable that it is lucky for us that it that it is easy for John....

The approach thus fails to express a significant generalization: namely, that the same kinds of restrictions govern the order of nouns, adjectives, and clauses; and that these are a matter of semantic rather than phrase-structural properties that these constituents share.[6] As it happens, this generalization can be expressed in terms of notions already available in linguistic theory: lexical properties common to the heads of the respective constituents in question (e.g. McConnell-Ginet 1982: 170–71); and scopal relations that hold between these constituents (e.g. Ernst 1997), which result in coherent or incoherent interpretations depending on the meanings that these constituents receive. FC approaches to adverbs, though designed to account for the facts of adverb distribution illustrated in 1, have no means to capture the

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[4] A similar point is made by Baker (1991: 420), who notes the 'drastic complications' in the description of phrase structure or θ-rôle assignment that would be necessary for 'a theory that tries to distinguish raisable from nonraisable verbs on the basis of θ-assigning properties'.

[5] I wish to thank Steven Pinker for helpful remarks on this matter.

[6] Simialr observations have been made by Jackendoff (1972: 90–92) and Ernst (1997), among others.

entirely analogous facts illustrated in 19–21 without further enrichments to the syntax. This casts even greater doubt on the utility of the already considerable enrichment to the syntax that the FC approach represents; and thus on the success of this approach in altering the division of linguistic labour by encoding lexical information relevant to adverb distribution directly in phrase-structural terms.

That the attempt to encode lexical information in this way does not achieve the appropriate level of generality can also be seen in various other coöccurrence restrictions that the FC approach has no means to capture, such as those involving adverbs and verbs and two adverbs, as illustrated in 22:

(22)   a. * Seth slowly broke the eggs quickly.
        b. ?? John arrived intentionally.

Neither of these patterns has any obvious explanation in syntactic terms, since each hinges on compatibilities between lexical items that affect only the coherence of the descriptions of the situations to which the sentences containing these items refer. Likewise, the differences in acceptability between the following sentences is most plausibly traced to differences in the meanings of the respective adverbs that appear in them and accordingly their greater and lesser appropriateness in polite requests:

(23)   a. Could she possibly give us an answer later today?   (Battistella 1991: 60, (26))
        b. ?? Could she probably give us an answer later today?

The data reviewed above thus highlight a basic difficulty of the FC approach: this is that its syntactic rendering of certain lexical properties of adverbs offers little insight into these properties; and no sense of how they might be related to the lexical properties of elements that belong to other categories, or of what rôle such properties might play in patterns of distribution beyond those related to the simple ordering of elements. This is particularly true given that the FC approach takes the distribution of adverbs to be essentially 'an accident, an artifact of UG's just happening to have the order of heads that it does', thus precluding any 'deeper generalization' about this order (Ernst 1997). Of course, the data exemplified in 19–21 are squarely at odds with the claim that the ordering of adverbs reflects a primitive syntactic fact about languages, and cast further doubt on the viability of the FC approach. What we find in this approach, then — and in the theory of phrase structure on which it is based, according to the critiques of Borsley (1997) and others — is yet another instance of an analysis that drastically reduces the hypothesis space in one domain, only to be 'forced to introduce ad hoc complications elsewhere' (Baker 1991: 426).

3. Adverb Argument Structure

Much of the stipulativeness that we have just witnessed in Cinque's FC analysis of adverb order can be eliminated on more 'modular' approaches, which do not trace this order to a single source. Approaches of this kind have, nevertheless, recognized the crucial dependence of this order on adverb meanings, assigning a central rôle, in particular, to the argument structure of adverbs in determining their distribution (e.g. Bellert 1977; McConnell-Ginet 1982; Ernst 1984; Rochette 1990). This will accordingly be the starting point of the analysis that I shall be proposing here. What will distinguish this approach from previous ones, however, is its extensive use of the tools of Pustejovsky's 'generative

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lexicon' (GL) theory to develop this insight.[7] These tools — which, in addition to argument structure, include 'lexical inheritance structure' (LIS) and event (including subeventual) structure, and 'coercion' operations, to be described below — permit a simplification of the inventory of adverb argument structures, while at the same time enriching lexical description by attributing a more 'layered' lexical structure to adverbs and other elements.

Given the previous discussion, the basic goal of this analysis is to characterize the relation between adverb meanings and positions in a manner more flexible than that associated with the FC approach, and one which has the capacity (i) to generalize to various adverb-adverb and adverb-verb restrictions, as well as to analogous restrictions among other syntactic categories; (ii) to accommodate categorization uncertainties, interspeaker variability, and the acceptability of 'ungrammatical' positionings of various adverbs; and, finally, (iii) to generalize to other languages in an unstipulative way, avoiding further enrichment of the syntax without explicit syntactic evidence for this enrichment. A detailed presentation of an analysis that fufils these desiderata is well beyond the scope of this study, in which I can offer no more than an outline of such an analysis. This should, however, be sufficient to show how the analysis might address the above concerns.

This outline might begin by distinguishing three basic adverb classes in the verbal domain.[8] (I shall make some brief remarks below about adverbs in other syntactic domains.) These are (i) 'propositional' adverbs, which take constituents that designate temporally specified situations (corresponding to propositions);[9] (ii) 'situation-related' adverbs, which take constituents that designate situations, and quantify over or predicate some property of these situations; and (iii) 'situation-internal' adverbs, which take constituents that designate properties or relations and 'add a new dimension in terms of which situations are classified... and classify them in these new terms' (McConnell-Ginet 1982: 164). Basic members of each class — I shall be considering certain 'derived' cases in §4 below — plausibly include, respectively, (i) epistemic adverbs like *apparently, evidently, possibly* and conjunctive adverbs like *however, nevertheless,* and *firstly* (e.g. Bellert 1977: 348); (ii) quantificational adverbs like *always* and *mostly,* and 'floating quantifiers' like *all* and *each*; and (iii) 'manner' adverbs like *brilliantly, loudly,* and *roughly* (e.g. Ernst 1984: 94).

Given these argument structures, we can account for many of the adverb ordering patterns described above by adopting the following view of how event structure is projected in the syntax. This is that a property or relation is designated by the head of the main VP; a complete temporally unspecified situation is designated by this head together with its arguments, which constitutes the VP as a whole; and a temporally specified situation is designated by a tensed or otherwise temporally specified VP.[10] Together with a conservative view (also adopted in e.g. Ernst 1997) of adverb positions as being created by left- and right-adjunction,[11] this view leads to the claim that a 'propositional' adverb may appear in any adverb position that has in its scope a temporally specified VP; and 'situation-related'

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[7] Note, however, that Pustejovsky's analysis of events in terms of subeventual structure figures in Rochette's (1990) analysis.

[8] This analysis has many similarities with those of Rochette 1990 and Ernst 1997, *q.v.*

[9] I use 'situation' as a cover term for 'states', 'events', and 'processes'.

[10] For reasons of space, I ignore here the contribution of auxiliary verbs to the aspectual description of a sentence, although this must figure in a complete account of such a description.

[11] The assumption most compatible with my claims is that VP-external adverbs are adjoined to XPs, while VP-internal adverbs are adjoined to V's within the main VP. Unfortunately, a detailed defence of this view cannot be undertaken here, and must await further study.

and 'situation-internal' adverbs must appear, respectively, outside and inside the main VP. This claim appears to be consistent with the distributional patterns exemplified in 24–26. (Note that 24b–b′ also give support to the claim that a VP may receive its temporal specification not only from tensed elements but other auxiliary elements and from governing verbs.)

(24)   a.   (Probably) she (probably) has (probably) been (*probably) sleeping
           (*probably).   (= 2a)
        b.   She could have perhaps actually refused to go.   (Ernst 1991: 752, n. 2, (i))
        b′ ? Barbara regrets possibly leaving the stove on.

(25)   The students (all) will (all) have (all) left (*all).

(26)   His bald pate (*brilliantly) shone (brilliantly) in the noonday sun.
                                                  (based on Ernst 1984: 94, (309d))

The claim is also consistent with the relative ordering of members of the three classes, as exemplified in 27 (given the additional assumption that tensed auxiliaries are generated in V, and may move to Infl, as suggested in Ernst 1991 and elsewhere):

(27)   The students will (probably/*brilliantly) (all) (probably/*brilliantly) (all) have (*probably/all/*brilliantly) been performing (*probably/*all/brilliantly).

Significantly, the acceptable relative orderings of *probably* and *all* suggest that either order of 'propositional' and 'situation-related' adverbs is available in positions that satisfy each of their respective argument structure requirements, in which case each may take the other in its scope.[12]

    The scheme just spelled out above does not, however, account for various puzzling cases of adverb position that we have already encountered, which include those of adverbs that occur VP-internally but nevertheless appear to 'operate' on the situation as a whole. Three rather different cases of these are 'agent-oriented' adverbs like *intentionally*, 'manner' adverbs like *quickly* and *slowly* — which, as we noted above (see 12–14), shift between 'event' and 'manner' readings —, and quantificational adverbs like *often*. It is here that the 'lexical inheritance structure' (LIS) component of GL theory, which characterizes 'how a lexical structure is related to other structures in the type lattice' (Pustejovsky 1995: 61), may play an important rôle. What I wish to suggest is that the LISs of these adverbs specify particular kinds of argument or event structures for the verbs with which they may occur.[13] Accordingly, an 'agent-oriented' adverb like *intentionally* specifies in its LIS verbs that take NPs designating entities that are the 'agents' of an event or process. Such a specification thus serves to capture the claim that this adverb, when it appears VP-internally, does serve to 'restrict' the range of situations referred to — the function described in §2.2 above — while at the same time exhibiting an 'agent orientation'. Of course, the difference between VP-internal and VP-external readings of this adverb is, as

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    [12] This may or may not correlate with a difference in interpretation, depending on the meanings of the adverbs themselves; cf. 27, involving *probably* and *all*, with 15, involving *probably* and *already*.
    [13] For reasons of space, I shall be characterizing these LISs informally in the text, rather than making use of the notation of Pustejovsky 1995 or other studies in the GL framework.

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we noted earlier, rather slight — although perhaps still present, as 28a suggests. However, it emerges more clearly with other 'agent-oriented' adverbs, as exemplified in 28b–d, thus vouching for the utility of analysing such adverbs in terms of this 'agentive verb' LIS specification:

(28) a. You did that intentionally!
      b. Joe answered reluctantly.
      c. Chester stepped deliberately on each crack.
      d. Trish answered knowingly.

Notice, too, that such a LIS specification also permits a ready description of patterns of acceptability like that exemplified below:

(29) a. ?? John arrived intentionally.
      b. John left the door unlocked intentionally.

Turning now to the cases of 'higher' readings of VP-internal 'manner' and quantificational adverbs, we might speculate that these can be analysed in terms of the rôle of subevents in a complex event structure, to which Pustejovsky (1991) has drawn attention. If we follow Pustejovsky in characterizing a predicate like 'walk to the store' (see 12b) in terms of a process of walking and a resultant state of being at the store, and permitting an adverb like *quickly* to modify constituents of event structure corresponding either to the process or to the complex event as a whole, then we have the beginnings of an account of the shifts between 'manner' and 'event' readings of *quickly* and other adverbs illustrated in 12–14 that still preserves the claim that VP-internal adverbs serve to 'restrict' the range of the situations referred to by the predicate. Similar remarks apply to VP-internal occurrences of quantificational adverbs like *often*, which may accordingly be understood to contribute to the description of a complex situation composed of repeated situations, rather than simply to quantify over a set of situations denoted by the VP, as they appear to do when they occur VP-externally:

(30) a.   Seth drank beer often.
      b.   Seth often drank beer.

Of course, these remarks reflect no more than possible directions for research, and have not addressed many complications and much research on these adverb classes. This is also true of the preceding account of adverb argument structure as a whole, which has inevitably neglected the argument structures of many classes of adverbs discussed in the literature — in particular, the 'domain', 'barely', and 'degree of precision' adverbs discussed extensively in Ernst 1984, which appear in AdjP, NP, and AdvP projections. These seem to require a more sophisticated treatment of adverb argument structures than essayed here, plausibly involving underspecification with respect to the syntactic category of its arguments (on this, see e.g. Ernst 1984: §§2–3). Such an approach would, however, be very much in the spirit of the analysis sketched here.

4. 'Coercion'

Another complication to the picture of adverb argument structures just presented takes the form of the following two phenomena. One, to which we have alluded at many points in this study but not yet been given an analysis, is that of 'situation-internal' adverbs

that also have higher, 'situation-related', readings. The other is that of adverbs of various classes[14] that appear sentence-initially, followed by a sharp intonational break. These are illustrated, respectively, in 31–32:

(31)   a.   Louisa rudely departed.
       b.   Louisa departed rudely.   (McConnell-Ginet 1982: 160, (37))

(32)   a.   Probably, Joe had another fight with Trish.
       b.   Frankly, I don't care.
       c.   Reluctantly, Seth let Joe stay over.
       d.   Botanically, a tomato is a fruit.   (ibid., 176, (75a)))
       e.   Sternly, the headmaster lowered his spectacles from the bridge of his nose.
                                                         (Ernst 1984: 293, (193a))

What I propose is that both of these phenomena be described in terms of 'coercion' — an operation figuring prominently in GL theory, whereby one constituent is assigned an unexpected reading when in construction with another constituent.[15] Examples of other phenomena that have been analysed in terms of 'coercion' are given in 33:

(33)   a.   wooden turtle   (Jackendoff 1997: 65)
       b.   Mary began the novel.   (Pustejovsky 1993: 75, (1c))

In each case, one constituent — the N *turtle* and the NP *the novel*, respectively — has, by virtue of being in construction with another constituent — the Adj *wooden* and the V *began*, respectively — been assigned a special sense, determined in large part by its own lexical properties.

As applied to the adverb phenomena just mentioned, an analysis in terms of 'coercion' amounts to the claim that 'situation-internal' adverbs may be 'coerced' into 'situation-related' readings when they appear adjoined to the VP; and adverbs of various types may be 'coerced' into 'topics' — as I shall be describing below — when they appear adjoined to the sentence. Such an analysis can serve to relate different occurrences of what are apparently the same adverbs — in particular, capturing the fact that 'higher' adverbs can be derived from 'lower' ones, but not vice versa — much as the meaning postulates proposed by McConnell-Ginet (1982: 168ff.) and others can. However, it is able to do so by means of a far more general mechanism (see e.g. Pustejovsky 1993: 90). Moreover, because the lexical properties of the 'coerced' constituent can contribute to the output of the 'coercion' operation, this analysis can capture the considerable variety in the interpretative effect of such adverb 'lifting' — as demonstrated by the sentences in 34 — far more readily than the meaning postulate proposed by McConnell-Ginet, which converts a VP-internal adverb Adv to its VP-external counterpart Adv' such that 'Adv' VP' is synonymous with 'act Adv to VP'.

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[14] This position may also host NP and PP adverbials, although these will not be considered here.

[15] Note that many instances of this operation (including those exemplified in 33) appear to involve government of a 'coerced' constituent by a 'coercing' one (see e.g. Pustejovsky 1995: §7). However, since this generalization does not obviously hold for the kinds of 'adverb coercion' to be proposed below, the question remains whether a single structural relation does indeed characterize the wide variety of phenomena amenable to a 'coercion' analysis. I shall leave this matter for future research.

(34)   a.   Bill has completely destroyed the evidence.   (based on 1a)
       b.   John has cleverly answered their questions.   (= 8b)
       c.   John intentionally knocked on the door twice.   (= 9a)
       d.   John quickly walked to the store.   (= 12a)

The analysis can also capture what appear to be lexically-induced restrictions on adverb 'lifting', such as the following one:

(35)   a. * His bald pate brilliantly shone in the noonday sun.
       b.   He brilliantly conned his way out of the police station.

The unacceptability of this adverb VP-externally in 35a but not 35b seems traceable to the fact that it indicates a manner that has a certain result — a meaning compatible with a situation of conning (just in case the con is a brilliant one), but not with one of his bald pate shining (which is difficult to construe as brilliant).

A 'coercion' analysis also offers a plausible way to capture various data associated with 'fronted' adverbs. Perhaps most significantly, such an analysis can reconcile two observations about adverbs in this position: (i) that a wide range of adverbs may be 'fronted', as the examples in 32 show, suggesting that the position hosting these adverbs does not bear a consistent logico-semantic relation to the rest of the sentence;[16] and (ii) that, despite the plausibility of analysing this position as one to which adverbs move, the adverbs in question do not show evidence of movement, as the data in 36 indicate:

(36)   a.   * Quickly, John said that he ran home.
       b.   How quickly did John say that he ran home?
       c.   Never had John run so quickly.

What these observations suggest is that 'fronted' adverbs are instances of 'hanging topic left dislocation' (HTLD) structures (e.g. Anagnostopolou 1997), which likewise have been argued to be distinguished from the rest of the sentence by a sharp intonational break, and not to involve movement. A further point of similarity between 'fronted' adverbs and more standard instances of HTLD is the acceptability of each in embedded and *wh*-movement contexts, as demonstrated in 37–38:

(37)   a.   I said that quickly, everyone was drunk.
       b.   I said that my father, he was tight as a hoot-owl.
                                     (Ross 1967; in Anagnostopolou 1997: 167, (40b))

(38)   a.   Frankly, what do you think about this?
       a′. Quickly, what were the main causes of the Russian Revolution?
       b.   And your appointment, did you arrive on time?   (Isard 1974: 246)

These facts about 'fronted' adverbs can now be related to 'coercion' as follows. As already suggested, these adverbs receive interpretations that follow neither from their movement from a lower base position, as is the case with *wh*-elements, nor from their oc-

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[16] The problem of 'sentence-initial occurrences of what seem to be VP-internal modifiers' was already noted in McConnell-Ginet 1982: 156, n. 13.

currence in a position in tree structure that makes a uniform contribution to interpretation. Instead, their interpretations are 'coerced' by their base-generation in a 'topic' position, which (just as in the case of other HTLDs) is associated with the function of establishing an anaphoric relation between the situation designated by the sentence in its scope and one already established in the discourse.[17] This 'discourse-linking' function of 'fronted' adverbs is illustrated in 39:

(39)   a.   The children heard the sound of lightning.
Quickly, they left their seats and hid under the table.
b.   I wonder what the children did when they heard the sound of lightning.
Probably, they left their seats and hid under the table.

Note finally that, just as we saw in the case of 'coerced' VP-external adverbs, both the ability of a given adverb to be 'fronted' and the reading that it receives in this position appear to depend directly on its lexical properties. For example, *quickly*, which indicates only a rate of movement, can behave as either a 'situation-related' (39a) or 'hearer-oriented' (38a′) adverb; whereas *frankly*, which indicates a manner of expression, is consistently 'coerced' into a 'speaker-oriented' reading. Adverbs that cannot be 'fronted' seem to be those like *barely*, which, given their highly underspecified lexical structures (as suggested above), provide too impoverished a lexical basis for establishing a clear relation to previous discourse.

(40) * Barely, the men could understand his message.   (based on Ernst 1984: 215, (187))

6. Conclusion

What I have attempted to show in this study is that adverb distribution is not plausibly handled in a 'monolithic' fashion — in particular, that reflected in the FC analyses of Cinque and Alexiadou. What I have proposed instead is a 'modular' analysis that invokes argument structure and 'coercion' operations to account for the data in question. My discussion of these theoretical devices has unfortunately been very brief, informal, and programmatic. Despite this, I hope that it has still succeeded in demonstrating the utility of the kind of theory in which they are embedded — which, by assigning a greater share of 'linguistic labour' to the lexicon, permits a more plausible and empirically adequate account of adverbs and other linguistic phenomena than approaches like Cinque's and Alexiadou's, which attempt to encode lexical properties directly in syntactic terms.

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[17] Such a discourse-linking function for temporal adverbials has frequently been noted in the literature; see e.g. Partee 1984.

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