

The Syntax of Adverbs: An LFG Approach

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Caroline Cobb
Pembroke College

Oxford University

Committee for Comparative Philology, Linguistics and Phonetics

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0. Introduction

Having once been identified as ‘perhaps the least studied and most maligned part of speech’, the adverb has been widely investigated since, with little agreement arising (Jackendoff 1972, 47). In English, adverbs seem to be both freely occurring and highly restricted in terms of distribution. Theories have been put forth in both the syntactic and semantic realms proposing dependency of adverb placement on specialized rules that access certain semantic factors of the adverbs themselves (Jackendoff 1972), on feature checking with predetermined nodes of attachment (Cinque 1999, Alexiadou 1997), and on scoping relations amongst adverbs themselves and amongst adverbs and verbs (Ernst 1984, 2002). One theory discussed and drawn on below even proposes a functional determination of ordering restrictions (Hodge 1976). Though fairly wide-ranging in their opinions regarding the deciding factor in adverb distribution, each theory, and in fact most all theories, rely on a given classificatory system that divides adverbs into an array of groups based on semantic or functional properties, demarcating subject-oriented, speaker-oriented, and manner most commonly, though modal, epistemic, degree, frequency, time and many others have also been presented in the literature.

This paper examines the placement of adverbs relative to auxiliaries and main verbs and seeks to formulate a practicable syntax in an LFG framework to predict correct distribution and ordering restrictions for predicational adverbs. Ernst defines ‘predicational adverbs’ as those that ‘require their sister constituent to be their FEO [Fact-Event Object: a proposition or event] argument, mapping them onto a gradable scale,’ distinguishing them from domain (*mathematically, chemically*), participant (*on the wall, with a stick*), and functional adverbs (*now, again, even, not*) (Ernst 2002, 9). Our

definition, though couched in different terms, will define the same subset of adverbs. We define predicational adverbs as those adverbs that establish, assert or attribute some property to a larger entity of the sentence or the sentence itself as a whole. Predicational adverbs typically end in *-ly* and, as we will argue, adjoin to either the main clause (I') or the verb phrase (VP).

We first outline the basic distribution of adverbs in English, demonstrating their interaction with auxiliaries and main verbs and briefly mentioning the influence of functional and semantic factors on placement. We will see that though there are three common positions in which adverbs can occur in English, the acceptability of individual adverbs in each of those positions is dependent upon the relation of the adverb to the arguments of the sentence on a functional level. We propose that the semantic groups into which adverbs have previously been divided are insufficient for syntactic work and that the properties exhibited by an adverb that accord it to such a class are not semantic, but rather functional and, as such, internal to the adverb, and that they can be accessed by the functional structure of LFG, allowing its use in the syntax with no additional machinery in either the syntactic or semantic module. No special phrase-structure rules are necessitated for individual or individual sets of adverbs, only the addition of functional notations on pre-existing rules and the specification of functional attributes and values for individual adverbs.

1. The Data

Our exploration of the data in this chapter will expose four facts regarding the syntax of predicational adverbs. Through a discussion of the canonical positions in which adverbs can appear, we will see that though predicationals have a less restricted range of occurrence than other adverbs, there are still restrictions within the group that prevent certain adverbs from occurring in certain positions, and that adverbs capable of appearing sentence-initially are both more and less restricted than other predicationals, warranting their exclusion from our study. We will then examine the possibility of meaning alternation with position and see that predicationals typically display two meanings, roughly corresponding to higher and lower parts of constituent structure. We will also find that predicationals are typically rigidly ordered when two or more occur in the same sentence. The chapter concludes with a discussion of the sub-classification of predicational adverbs and the necessity of using syntactic rather than semantic information in the classification process.

1.1 Position and Distribution

In English, adverbs can occur sentence-initially, before or after a single auxiliary, or sentence-finally.

- (1) a. Frankly, Ross has hidden the biscuits.
- b. Ross cleverly has hidden the biscuits.
- c. Ross has probably hidden the biscuits.
- d. Ross has hidden the biscuits obviously.

However, not all adverbs can occur in all positions. Some of the sentences in (1), for example, become unacceptable if their adverbs are placed in other positions.

- (2) a. Obviously, Ross has hidden the biscuits.
 b. Ross probably has hidden the biscuits.
 c. *Ross has frankly hidden the biscuits.
 d. Ross has hidden the biscuits cleverly.

While (2a-b) and (2d) are still acceptable with their new adverbs, (2d) seems to have a different meaning than its counterpart (1b). In sentence-final position in (2d), *cleverly* seems to modify *hidden*, yielding the interpretation that Ross has hidden the biscuits in a clever way (perhaps by placing them in the freezer where no one will look). However, (1b), with *cleverly* in pre-auxiliary position, seems to mean not that the way in which Ross hid the biscuits is clever, but rather that it was clever (at least from the speaker's point of view) for Ross to hide the biscuits at all, regardless of where he put them. In the lower, sentence-final position, with the 'way in which' interpretation, *cleverly* modifies or is an adjunct to the verb, while in the upper, pre-auxiliary 'it is ADJ that' interpretation, it modifies or is adjunct to the clause. But we will return to this later. First, we will discuss some data that does not seem to fit the pattern of meaning alternation just described.

1.1.2 Disjunct Adverbials: A Short Digression

It is worth pointing out that (2a) shares its interpretation with what are often called 'peripheral' or 'disjunct' adverbials (Haegeman 1991, Cobb 2006), which can appear at major clausal boundaries with comma intonation.

- (3) a. Obviously, Ross has hidden the biscuits.
 b. Ross, obviously, has hidden the biscuits.
 c. Ross has, obviously, hidden the biscuits.
 d. Ross has hidden the biscuits, obviously.

Each of the adverbs in (3) displays the ‘it is ADJ that’ interpretation, modifying the entirety of the clause, and does not have a ‘way in which’ reading available to it, despite similarity in linear position with those that have only that interpretation available.¹

- (4) a. Ross has hidden the biscuits, obviously.
a.’ It is obvious that Ross has hidden the biscuits.
a.’’ #Ross has hidden the biscuits in an obvious manner.
b. Ross has hidden the biscuits obviously
b.’ #It is obvious that Ross has hidden the biscuits.
b.’’ Ross has hidden the biscuits in an obvious manner.

It is furthermore notable that sentence-initial adverbs seem capable of appearing only with comma intonation, as in (5), and that all adverbs capable of appearing sentence-initially seem to offer an external evaluation of or judgment on the proposition of the sentence, making adverbs without such interpretations available to them ungrammatical, as in (6).

- (5) a. Obviously, Ross has hidden the biscuits.
b. *Obviously Ross has hidden the biscuits.
- (6) a. Probably, Ross has hidden the biscuits.
b. Frankly, Ross has hidden the biscuits.
c. Surprisingly, Ross has hidden the biscuits.
d. *Passionately, Ross has hidden the biscuits.

In (6d), *passionately* has no interpretation whereby it can be understood as the speaker’s comment on the sentence, and so is disallowed.

Clearly, these cases of comma intonation, including all sentence-initial adverb occurrences, constitute a principled exception to standard, phonologically integrated

¹ The ‘#’ symbol is used here to denote a disconnect from the relevant adverb sentence.

adverbial occurrences and thereby to standard adverbial syntax, as will be discussed and argued for below. As such, comma intoned adverbials will be omitted from this paper.²

1.2 Patterns of Occurrence

From the three primary positions available to phonologically integrated adverbials – pre-auxiliary, post-auxiliary, and sentence-final – six common distributional patterns of acceptability filter out.³ Jackendoff (1972) identifies these patterns, which have been subsequently employed in many theories of adverbial syntax.

- (7) All positions with no change of meaning (*quietly, quickly, reluctantly*)
 - a. Quietly, Ross has hidden the biscuits.
 - b. Ross quietly has hidden the biscuits.
 - c. Ross has quietly hidden the biscuits.
 - d. Ross has hidden the biscuits quietly.

- (8) All positions with change of meaning (*cleverly, carefully, happily*)
 - a. Cleverly, Ross has hidden the biscuits.
 - b. Ross cleverly has hidden the biscuits.
 - c. Ross has cleverly hidden the biscuits.
 - d. Ross has hidden the biscuits cleverly.

- (9) Initial and auxiliary only (*probably, apparently, obviously*)
 - a. Probably, Ross has hidden the biscuits.
 - b. Ross probably has hidden the biscuits.
 - c. Ross has probably hidden the biscuits.
 - d. *Ross has hidden the biscuits probably.

- (10) Auxiliary and final only (*completely, easily, purposefully*)
 - a. *Completely, Ross has hidden the biscuits.
 - b. Ross completely has hidden the biscuits.
 - c. Ross has completely hidden the biscuits.
 - d. Ross has hidden the biscuits completely.

² For more information on comma intoned adverbials see Haegeman (1991), Espinal (1991), and Cobb (2006). The latter proposes a ‘disjunct’ analysis of comma intoned adverbials in line with the LFG account proposed here for those that are phonologically integrated.

³ Henceforth, all references to primary positions or to ‘adverbials’ without further specification will be to phonologically integrated adverbials. Comma intoned adverbials will be largely ignored, though where they have been included in general theories of adverbial syntax in the literature, they will be included here. Any further mentions will be justified as and when they occur.

- (11) Final only (*more, hard, early*)⁴
- a. *Hard, Ross has hit Ryan.
 - b. *Ross hard has hit Ryan.
 - c. *Ross has hard hit Ryan.
 - d. Ross has hit Ryan hard.
- (12) Auxiliary only (*merely, truly, simply*)
- a. *Merely, Ross has hidden the biscuits.
 - b. Ross merely has hidden the biscuits.
 - c. Ross has merely hidden the biscuits.
 - d. *Ross has hidden the biscuits merely.

Predictably, the most highly debated and examined position is the auxiliary, as it is in the auxiliary that a single adverb can take on multiple interpretations, as seen with *cleverly* in (8b-c). In fact, we increase the controversy surrounding the auxiliary, as we contest that Jackendoff's statement that adverbs like *quietly* and *quickly* maintain a constant meaning on both sides of the auxiliary and in sentence-final position is in fact incorrect. We argue that there is a subtle functional difference between (7b) and (7c) in that the pre-auxiliary occurrence attributes quietness to Ross and is therefore subject-oriented, while the post-auxiliary occurrence can be manner, attributing quietness to the act of hiding, though Ross himself may have been loud. Context helps clarify our argument.

- (13) Ross chatted away incessantly about the football as he quietly slipped the biscuits into the freezer.

Though some may argue that this use of *quietly* is metaphorical, we maintain that metaphorical or not, it still describes the 'way in which' Ross hid the biscuits and hence warrants classification as 'manner' in the lower position, discrediting Jackendoff's observation. With designation of 'manner-like' adverbs that occur pre-auxiliary as subject-oriented, we have relegated ambiguity between clausal and manner interpretations to only the post-auxiliary position, though resolution of issues in only this single position

⁴ Typically, adverbs that can occur only in final position are of the non *-ly* variety, except, debatably, *terribly*, which is most acceptable in final, but has been said to be acceptable in initial and aux as well.

have proven difficult for past theories. It is the resolution of this ambiguity that informs much of the literature in the field and around which much of this paper revolves, though we seek to address the distribution of predicational adverbs as a whole.

In addition to their ability to change meaning with position and the scattered patterns of occurrence, predicationals also exhibit a rigid ordering pattern in cases of multiple occurrence.

- (14) a. Ross wisely has hidden the biscuits sneakily.
a.' *Ross sneakily has hidden the biscuits wisely.
b. Ross probably has politely hidden the biscuits.
b.' *Ross politely has probably hidden the biscuits.
c. Ross (sneakily) has hidden the biscuits (sneakily).
c.' Ross (wisely) has hidden the biscuits (wisely).
d. Ross (politely) has (politely) hidden the biscuits.
d.' Ross (probably) has (probably) hidden the biscuits.

Both *wisely* and *sneakily*, and *probably* and *politely* can occur in the same sentence, as shown by (14a) and (14b), respectively. However, when their relative orders are reversed in (14a') and (14b'), the sentences become ungrammatical. In both cases, both adverbs can occur in either position alone, as in (14c-d'). The ungrammaticality of the sentences in which they occur together then arises not from an ungrammatical occurrence of either adverb, but some interaction that occurs when they appear together.

Predicationals are easily singled out from other adverbs as they almost always end in *-ly* and must be sister to the argument they modify, a fact that will we see to be quite important later on (Ernst 2002, 9). Because predicationals exhibit the most widely varying distribution and are most likely to lead to ambiguous interpretation in the auxiliary position, they shall serve as the focus of this paper. As predicationals rarely

exhibit the ‘final only’ or ‘auxiliary only’ patterns of distribution, adverbs falling into these two patterns will be largely omitted from the discussion.

In an effort to resolve the distributional issues of previous theories without extraneous machinery, this paper argues for an analysis of adverbs that places appropriate emphasis on the relationship between syntactic distribution and grammatical function. Clearly, there is no one-to-one association between adverbs and syntactic positions, though we will see that some theorists have proposed exactly that. Furthermore, the fact that some adverbs clearly cannot be said to exhibit a single interpretation independent of position indicates an interaction between function and position. While previous works argue that the interaction is in fact syntactico-semantic, such theories are challenged by the fact that the intrinsic meaning of the adverb itself does not change. Rather, the adverb’s interaction with the arguments of the sentence, ie its function, vary with position.

1.3 Class and Orientation

As demonstrated and briefly explained above, different adverbs seem to comment differently on the sentences in which they appear. For instance, repeating examples from above for simplicity, *obviously* seems to convey the speaker’s perception of the event the sentence describes, while *cleverly* describes the way in which Ross performed the action.

- (15) a. Ross obviously has hidden the biscuits.
b. Ross has hidden the biscuits cleverly.

Most previous theories have latched onto these different relationships between adverb and sentence and identified them as something semantic. Most have also then gone on to use these relationships as a means of dividing adverbs into classes which can be used in

formulating a theory of their distribution. Indeed, something semantic happens when an adverb's meaning combines with and contributes to the greater meaning of the sentence in which it occurs. However, we argue that semantics are not the driving force behind their distribution and should be kept out of the syntactic analysis of adverbs. Some common classifications that use semantic or orientation-focussed analyses are given below, but are not commented on here extensively. Those informing this paper will be more closely examined later in the paper as will some not mentioned here.

- (16) a. Jackendoff 1972
 speaker oriented, subject oriented, manner
 b. Quirk et al. 1972
 conjunct, disjunct, process adjunct
 c. McConnell-Ginet 1982
 Ad-S, Ad-VP, Ad-V
 d. Frey and Pittner 1999⁵
 frame, proposition, event, process
 e. Ernst 2002
 speaker-oriented, subject-oriented, exocomparative, event-internal

With perhaps the exception of McConnell-Ginet, each of the above classificatory systems groups adverbs based on their role in a given sentence, either on what they are 'oriented' toward (Jackendoff, Ernst) or how they relate semantically or pragmatically to other arguments (Quirk et al., McConnell-Ginet, Frey and Pittner). Those relating to the speaker's opinion or certainty regarding the proposition conveyed by the sentence would be 'speaker-oriented', those relating to the way in which the action of the sentence was performed would be 'manner', 'conjunct' adverbs join two things together, 'frame' adverbs set up a reference for some part of the sentence, and so on. While dividing adverbs in this way and then cross-classifying them using both these 'semantic' classes and the distributional patterns given above is convenient, the theory is complicated by the

⁵ As discussed in Ernst 2002.

tendency of many adverbs to fall into multiple semantic classes. As shown above, ‘cleverly,’ for instance, can describe either the subject’s overall disposition or the manner in which he performs a given action.

- (17) a. Ross cleverly has hidden the biscuits.
b. Ross has hidden the biscuits cleverly.

In (17a), Ross was clever to have hidden the biscuits, though he may have done so in a stupid way. In (17b), the way in which Ross has hidden the biscuits is clever, though he may have been stupid to do so in the first place. The distinction is more clearly evident in the following contexts.

- (18) a. Ross cleverly has hidden the biscuits to prevent the dog from eating them, though he was stupid to hide them on a shelf near the floor.
b. Ross has hidden the biscuits cleverly in the freezer, though now he can rarely remember where they are when he wants one.

Many adverbs behave similarly, somewhat confounding semantic classification by yielding readings that vary with position, and other adverbs elude such systems altogether, or necessitate such highly specific classifications so as to make the entire practice of semantic classification utterly overwhelming. *Merely*, for instance, could be said to denote the degree to which something is something else, as can *completely*.

However, the two are not interchangeable.

- (19) a. Ross is merely a boy.
b. Ross is completely finished (with his homework).
c. *Ross is completely a boy.
d. ?*Ross is merely finished (with his homework).

While both adverbs have a notion of degree in their interpretation, *merely* seems to work better with nominal complements while *completely* is more appropriate with verbal complements. Similar classificatory problems arise in other cases as well. Ernst (2002)

argues that such distinctions are actually semantic selectional restrictions on the types of event-arguments adverbs can take. A full discussion of this issue is somewhat beyond the scope of this paper at this point, so we will simply state that while Ernst's argument is somewhat convincing, we believe it places too much reliance on semantics without enough regard for the syntactic aspects of such distributional patterns. We furthermore argue that development of different classes and sub-classes that can accommodate the subtle similarities and differences in meaning of various adverbs, whether focussing on their orientation or the types of event-arguments they take, would expand any syntactic system beyond the point of reasonable use and generate excess machinery in the grammar. This is not to say that the distinctions pointed to by division into sub-classes is useless, however such classification is devised, but rather to relegate such classification to the appropriate linguistic domain(s) and thereby free-up the syntax to do its job.

On a related note, some theories, which have largely been dismissed in more recent works, have proposed the existence of multiple lexical entries for adverbs taking multiple interpretations in different positions. While this does aid in resolution of the distributional/interpretational cross-classification problem, it fails to recognize the fact that the issue is not really solely semantic at all. In the case of adverbs like *cleverly*, whose interpretation differs with position, the actual meaning of the word itself does not change. Whether describing the disposition of the subject in pre-auxiliary position or the way the action was performed in sentence-final position, *cleverly* still means 'with intelligence', or something of that sort.

The difference in meaning that arises when two otherwise identical sentences feature the same adverb in different places must indeed arise from somewhere. Unlike some previous analyses, we maintain the notion of lexical unity. Where previous theories have proposed the multiple lexical entries or at least multiple definitions attached to a single lexical entry necessary to accommodate homonyms such as *ball* in *He bounced the ball* and *She wore a gown to the ball*, we maintain a single lexical entry and single definition for each adverb. The difference in meaning that arises between, say a pre-auxiliary and a sentence-final occurrence of the same adverb in the same host sentence, does not come from the adverb itself, but rather is a product of the interaction between the adverb's intrinsic meaning and the position in which it occurs. While this interaction and the consequent alternations of meaning are intriguing, they are not essential to the argument of this paper in that they do not affect the syntactic distribution of adverbs, but rather are something that is sorted out in the semantics. We shall, therefore, leave the matter of meaning alternation alone, instead concentrating on distribution, function, and the relationship between the two.

1.4 Summary

As evidenced by the data given above, a theory of adverb syntax must account for the following facts:

- The inability of certain adverbs to occur in certain positions
- The variable meaning accorded certain adverbs in different positions
- Rigid patterns of relative ordering amongst adverbs

Based on the data given above, and what we see as the ineffectualness of previous theories of adverb syntax, discussed below, we argue that relationships between arguments or clauses and adjuncts are not solely semantic, but incorporate functional

information. This paper argues for a functional classification of adverbs to the extent that it is grammatical or syntactic function, not semantics, that influences syntactic distribution. The exact mechanics of this classification and its interaction with syntax are the force behind the grammar developed in this paper.

The current proposal does not abandon, but rather drastically re-casts the use of adverbial classification in terms of distribution. While maintaining the terms for various ‘readings’ as given by Ernst (2002), the current analysis does not propose the terms as labels for some group to which an adverb belongs, but rather as labels for some property which belongs to a given adverb, i.e. as a feature, specified in its lexical entry. Before discussing our own proposal, however, we shall first discuss the literature on the topic.

2. Previous Analyses

Three main theories have guided the development of the literature surrounding adverbial syntax. The earliest work evolved out of transformational grammar's exclusion of the grammatical category 'adverb' from the base, but ultimately requires too much specialized syntactic machinery to be feasible. More recent work in the Association Theory operates under the assumption that adverbial meanings correlate one-to-one with a strictly hierarchical series of syntactic nodes. We contest that work in this theory is again too complicated to be useful, and carries other intrinsic weaknesses. Most recently, work has been done bordering the syntax-semantics interface proposing scope-based resolutions for issues of meaning variation with position. While each of these theories is supported by the data, we present, along with the supporting evidence, reasons we find each theory insufficient and the data in need of a new proposal.

2.1 Transformationalism

The transformational account of adverbial syntax actually begins with adjectives, rather than adverbs. As first proposed in Chomsky's *Syntactic Structures*, but adopted to a greater or lesser degree by a number of subsequent theorists, strict transformationalism operates under the assumption that adverbs do not exist as a primitive in the base, but rather are surface constituents derived from deep structure adjectival paraphrases.

- (20) John drove his car carelessly. ← John was careless at driving his car.
- (21) Frankly, John is an idiot. ← I am being frank in saying that John is an idiot.

Transformationalism proposes that a morphological transformation adds the *-ly* ending to the base adjective and a second transformation operates to insert the new lexical item into

the main clause while also deleting the ‘at’ clause and rearranging the verb. While in many cases the adjustments are semantically plausible, as the adjectival paraphrases yield equivalent interpretations to those of their adverbial counterparts, the necessary syntactic machinery, which is considerable, is not independently motivated and so renders the treatment inadequate.

Even if we were to accept the large amount of syntactic manipulation necessary to associate an adjectival paraphrase with an adverbial phrase, no single adjective paraphrase structure can be used as a basis for all adverbial surface structures, or even for all occurrences of a single adverb: a problem arising from the aforementioned multi-functionality of many adverbs.

- (22) a. Ross has hidden the biscuits cleverly.
b. Ross cleverly has hidden the biscuits.
c. Ross has hidden the biscuits in a clever manner.
d. Ross was clever to hide the biscuits.

Example (22c) can serve as a perfectly adequate paraphrase of (22a) while (22d) cannot, and (22d) can paraphrase (22b) while (22c) cannot. The machinery necessary to associate these, and any other acceptable paraphrases, to the appropriate adverb constructions would be astronomical and highly specialized for adverbs with no other reasonable use in the grammar.

The theory is further complicated by the fact that a significant number of adverbial constructions exist without plausible adjectival paraphrases.

- (23) a. The men were individually asked to leave.
b. #It was individual that the men were asked to leave.
c. #The men were asked to leave in an individual manner.

Neither (23b) nor (23c) adequately captures the semantic sense of the adverb in (23a).
The theory simply cannot address cases such as this.

Later transformational accounts (Radford 1988, Emonds 1976, among others) also propose a base free from adverbs, addressing adverbs as ‘positional variants’ of adjectives, based on their relative distribution, allowance of the same range of modifiers, and the morphological relationship between the two (Radford 1988, 141). Radford argues that because many adverbs are formed from adjectives +*ly*, because both adverbs and adjectives can be modified by *very/rather/quite* etc, and because they exist in complementary distribution, they are in fact variants of the single category Adjective.

While this conflation does simplify the base somewhat by reducing the number of categories necessary for syntactic description, it risks expanding the category Adjective, or ‘Adjective’, as Radford debates calling it (Radford 1988, 141), past the point of being sufficiently descriptive. Radford states that the particular type of an adjective can be determined by its distribution: adjectives modify nominals, and adverbs modify non-nominals (Radford 1988, 141). However, he supplies no further analysis of why certain adverbs can appear in certain positions and others cannot, nor does he explicate the variance in interpretation that is selectively available to adverbs dependent on position. Because of this insufficient explanation of the data as discussed above and for further reasons that will become clear below, the current analysis cannot accept this conflation. If types exist on adverbs as features, as is proposed below, and adverbs are merely a positional variant of adjectives, then those same features of type that exist on adverbs

must also exist on adjectives, which is clearly not the case. No adjective can be said to possess the feature ‘manner,’ ‘modal,’ or ‘evaluative’.

2.2 Association Theory

Association Theory, as Wyner (1998) calls it, developed both as a progression from and a reaction against strict Chomskian syntax and argues that the difference between interpretations issuing from sentences identical but for the placement of their adverbs depends on distinct hierarchical nodes of attachment for the adverbs. While Shaer (2003) argues that the ‘association theory’ is not really a single coherent theory, but rather a name which subsumes a number of analyses with significant differences, merging such disparate theories as those of McConnell-Ginet (1982), Cinque (1999) and Alexiadou (1997), and Ernst (2002) and Haider (2000) under the name ‘associative’, the present analysis rejects this classification as too broad. Rather, this paper addresses Cinque and Alexiadou as associative, separating out Ernst and Haider as scope-based or derivative, to be discussed later.

The most stringent, and therefore most strongly criticised of the association theories as they are delineated above is that of Cinque (1999), which argues for strict syntactization of adverbial meaning through a universal hierarchy of adverb positions. Using extensive cross-linguistic evidence, Cinque argues that the relative ordering of adverbs in a clause is determined by a universal hierarchy that is itself strictly determined by phrase structure, in which adverbs serve as specifiers of functional heads. Claiming the existence of ‘one head position to the immediate left and one head position to the immediate right of each AdvP’ (Cinque 1999, 45), Cinque’s analysis has adverbs occupying fixed positions

around which the V and Aux heads move to yield the appropriate surface structure. For example, Cinque observes that the order of the Italian adverbs *mica* ‘not’ and *piu* ‘any longer’ is fixed relative to one another, though they can occur together both before and after the verb, or divided by the verb (Cinque 1999, 47).

- (24) a. Non hanno mica piu mangiato.
 NEG they-have not any.longer eaten.
 ‘They haven’t eaten any longer.’
- b. Non hanno mangiato mica piu.
 c. Non hanno mica mangiato piu.
 d. *Non hanno piu mica mangiato.
 e. *Non hanno mangiato piu mica.
 f. *Non hanno piu mangiato mica.

(Cinque 1999, 47, his (9-11); glosses from Bobaljik 1999, 27).

Because the adverbs’ order must remain the same relative to one another, despite varying placement relative to the verb, Cinque concludes that adverb placement is fixed by the phrase structure, while the verb is allowed to move to any of the heads in whose specifier the adverb(s) reside.

Cinque’s Association Theory is supported by syntactic evidence in the literature. As Wyner (1998) points out, in line with the longstanding tenet of formal grammar, a modifier should exist in close proximity to that which it modifies (Wyner 1998, 250). Manner adverbs should, then, if taken as modifying the verb, appear in positions which allow them to adjoin to VP and must not appear in any position that would require they adjoin to IP (Wyner 1998, 251). This would rule out constructions such as:

- (25) a. *Bill passionately may have kissed Jill.
 b. *Bill may have kissed, stupidly, Jill.
 (Wyner 1998, 251; his (7a-b))

In (25a), *passionately* describes the manner in which Bill kissed Jill, and so is ungrammatical as it cannot adjoin to the main verb *kissed* in its pre-auxiliary position. In the same way, (25b) is also ungrammatical as *stupidly*, in what Wyner calls its ‘factive’ usage, whereby it modifies the entire clause *Bill may have kissed Jill*, and is paraphrasable as ‘It was stupid of Bill to kiss Jill,’ is also ungrammatical as it cannot attach to IP between the verb and direct object. The association claim is further supported by copying of manner adverbs into elided VPs, where ‘factives’, or clausal modifiers, cannot be placed (Wyner 1998, 251).

- (26) a. Bill kissed Jill passionately, and Will did too.
 a.’ Bill kissed Jill passionately and Will kissed Jill passionately.
 b. Stupidly, Bill kissed Jill, and Will did too.
 b.’ *It was stupid of Bill to kiss Jill and it was stupid of Will to kiss Jill.

(Wyner 1998, 251; his (8a-b), prime examples mine)

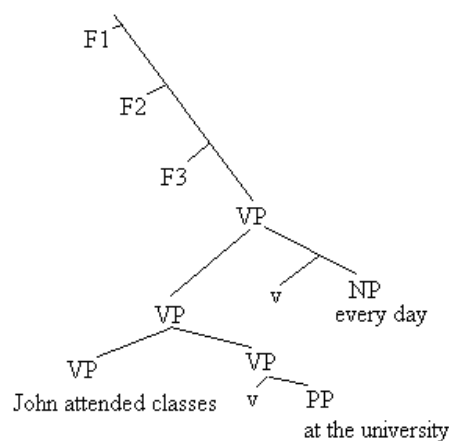
The manner usage of *passionately* is easily assigned to both Bill’s and Will’s kissing in (26a), while *stupidly* in (26b) can only be said to apply to Bill’s kissing Jill. While this evidence is somewhat convincing, it does not present a hard and fast argument for association, as the ungrammaticality of the sentences in (25) is debatable, and the elision argument relies on an analysis of VP-structure that not all theorists are willing to accept (Wyner 1998, 252).

However, Cinque’s argument has problems in and of itself, irrespective of debates regarding grammaticality of various distribution patterns and differing treatments of VP-ellipsis. Cinque groups manner adverbs together with ‘place, time...means, company, reason, purpose, and so forth’, under the classification ‘circumstantial’. For these

adverbs, he develops an analysis completely separate from that for subject- and discourse-oriented, evidential, etc, on the grounds that circumstantial adverbs differ from ‘AdvPs proper’ in that they do not exhibit a rigid order with respect to one another, are typically (with the exception of manner adverbs) realized as prepositional phrases, cannot appear in any pre-VP position (except sentence-initially, where they can occur in a ‘topic-like’ position), and function as modifiers on an event variable rather than sentence operators (Cinque 1999, 28-29). Though he ultimately ignores such non-circumstantial occurrences in favour of those more easily addressed by his analysis, he does propose two possible treatments, though neither in much detail.

The first follows from a Davidsonian semantic scoping analysis, and takes circumstantial adverbs, those that follow the verb’s complements within the VP, as predicatives deeply embedded as constituents of the VP, yielding a structure such as below, in which *at the university* is predicated of the VP *John attended classes* and *every day* is predicated of the larger VP *John attended classes at the university* (Cinque 1999, 28-29).

(27)



(Cinque 1999, 29; his (123))

The second analysis derives surface structures like that above from underlying structures in which the adverbial PP occupies the spec of a VP ‘shell’. The verb phrase proper then moves leftward to a higher spec (30).

Cinque’s dismissal of manner adverbs as requisite of a separate analysis casts doubt on his larger analysis of adverbials as a whole. Surely an analysis of subject- and speaker-oriented adverbs should be capable of addressing manner adverbials as well, as many adverbs, such as *cleverly* in (8b,d) above, can be seen to function as either subject-oriented or manner.

Cinque also struggles to address the interaction of auxiliaries and adverbs. In many of his examples, he notes the variable position of the auxiliary with respect to adverbs. In some cases, the auxiliary may occur lower than the adverb, as in (28a), and crucially, lower than adverbs such as *mica*, which can follow the main verb as in (28b).

- (28) a. Gianni purtroppo forse stupidamente mica **gli ha**
 Gianni unfortunately perhaps stupidly not to-him has
 piu telefonato.
 any.longer telephoned.
- b. Non hanno mangiato mica.
 NEG they-have eaten not
 (Cinque 1999, 47, his (7b); and 1999, 51, his (27a))

Because the auxiliary must precede the main verb in Italian, Cinque must propose a movement of the auxiliary from its base position below *mica* to a position above the adverb in order to maintain his analysis in the face of sentences such as (28b) above, in which the adverb follows both the aux and the main verb. As Bobaljik (1999) observes,

in order for the auxiliary to remain above the main verb in both base position and after moving around fixed-position adverbs, Cinque must allow a violation of the Head Movement Constraint (p27). The derivation of (28b) given in (29) below illustrates this.

- (29) [non hanno [mangiato [ADVP mica t_{aux} t_{part} [VP t_{part}]]]]
(adapted from Bobaljik 1999, 27; his
(6))

Ultimately, Cinque's analysis must be seen as too restrictive, as it rules out manner adverbs without considering the joint occurrence of some adverbs in both manner and subject-oriented or other capacities, as well as its violation of the independently necessary Head-Movement constraint in its treatment of auxiliary interaction with adverbs.

Additionally, Shaer acknowledges the failure of accounts like Cinque's to address the clausal/manner ambiguity that accompanies adverbs in auxiliary position and also points out their inability to cope with the occurrence of what he calls 'fronted, parenthetical and afterthought occurrences' of adverbs. Though such occurrences are beyond the scope of this paper and so shall not be dealt with here, the analysis offered here can be expanded to incorporate such occurrences. Certainly a theory that does not seek to address such occurrences is not sufficient and should be dismissed in favour of one that will.⁶

2.3 Derivatives

A third group of analyses, which we shall refer to as the 'derivative theories', argues that adverbial syntax is somehow derived from adverbial semantics and dates back to work by

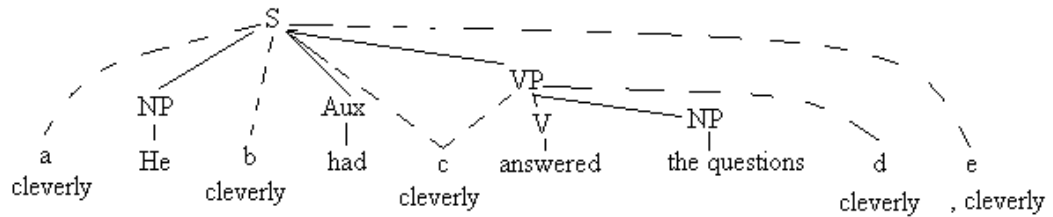
⁶ In fact, such 'fronted, parenthetical and afterthought' occurrences have been analysed as 'disjuncts' and treated in the framework here proposed in Cobb (2006).

Jackendoff in the early seventies but has been revitalised more recently by Ernst and Haider.

In his *Semantic Interpretation in Generative Grammar*, Jackendoff (1972) considers adverb distribution to be a direct consequence of semantic selectional restrictions and interpretation rules that operate on the syntactic level but incorporate semantic information. Jackendoff assumes the existence of a category Adv in the base, but regards the specifications manner, subject-oriented, speaker-oriented, etc as semantic markings only with no structural resonance (Jackendoff 1972, 49). Dismissing previous transformational accounts as insufficient for their inability to properly predict adverb occurrence without extraneous, otherwise un-motivated transformational machinery, he proposes semantic representations for each of three classes of adverbs: speaker-oriented, subject-oriented, and manner/time/degree.

While Jackendoff's analysis is heavily semantic, as he proposes semantic projection rules to account for various readings of adverbs, he does develop new phrase structure rules to license correct distribution allowing for ambiguity. According to his rules, which rely on a split-aux structure developed by Emonds (1970), adverbs occurring sentence-initially and pre-auxiliary must attach to S, while those occurring between aux and V or sentence-finally may attach to either VP or S (Jackendoff 1972, 79).

- (30) a. S → NP Aux VP
b. Aux → Tense (Modal)
c. VP → (have – en) (be – ing) V (NP) ...



The rules listed in (30a-c) provide the various tree structures shown in the diagram, where adverbs occurring in positions a, b, c, and e, will exhibit an S (clausal) reading, while positions c and d give VP (manner) readings.⁷ According to Jackendoff's analysis, each adverb's lexical entry designates the semantic structures in which it receives an appropriate interpretation (Jackendoff 1972, 71). Each semantic structure also has an associated projection rule as mentioned above, which contains a structural description of the trees to which it can apply, allowing the assignment of a partial semantic interpretation to each sentence on the basis of its syntactic structure (Jackendoff 1972, 72).

Jackendoff's projection rules are as follows:

- (31) a. P_{speaker} : embeds the functional structure of the sentence (expressed as $f(\text{NP}^1, \dots, \text{NP}^n)$), as the sole, unspecified argument of the adverb
- b. P_{subject} : embeds the functional structure of the sentence as the S argument of the adverb and the subject of the sentence as the NP argument
- c. P_{manner} : adds the adverb as an additional set of semantic markers on the function of the verb

Jackendoff's analysis is undoubtedly one of the seminal treatments of adverbial syntax and as such has provided the basis for a large number of subsequent works, including

⁷ Jackendoff's position (e) in this diagram can only occur with comma-intonation. We will consider this an 'afterthought' occurrence, following Shaer and Wyner, and so shall limit our discussion of sentence-final occurrences to those occurring without comma-intonation.

Cinque's treatment as mentioned above. Its strong demonstration of the close link between syntax and semantics is certainly one of its greatest advantages and was, at the time of publication, an unusual and groundbreaking analysis. It does predict the distribution and ambiguity found in English language adverbs, however, that is not to say that it is without problems.

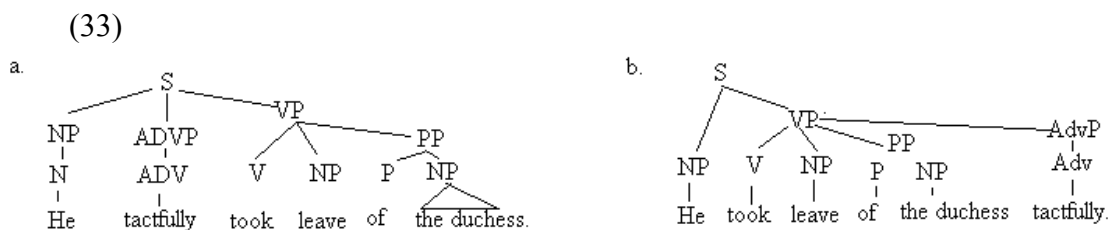
A number of points regarding Jackendoff's analysis have been exposed to criticism since its original publication. Among its weaknesses is an inconsistent application of projection rules required to cope with active-passive alternations. Jackendoff observes that subject-oriented adverbs are always related to the surface subject, whether in active or passive constructions, while manner adverbs do not exhibit such a shift. To account for this fact, he applies P_{speaker} and P_{subject} at surface structure, while maintaining application of P_{manner} at deep structure. If some adverbs can carry either a clausal or manner interpretation, as has already been shown to be the case, there is no way of knowing whether early application of P_{manner} is appropriate or whether interpretation should be held off until P_{subject} can apply at surface structure in cases where an adverb occurs between aux and V and can therefore be attached either to S or VP. Additionally, Jackendoff struggles to address occurrence of sentence final, seemingly sub-categorized adverbs such as *hard*, and *early*, in constructions like *John hit Paul hard* and *Ross arrived early* and to cope with *-ly* adverbs appearing in final position without a pause, and those appearing between elements of the auxiliary. As Ernst (1984) points out, it would be easiest to generate all such adverbs post-verbally in the base, but Jackendoff only allows post-verbal generation for non *-ly* sentence final occurrences, requiring that the others be 'transportable' from a base position immediately before the main verb, which is the only

space in which he allows the generation of *-ly* adverbs. He uses transportability as a way of side-stepping the necessity for special transformations for each adverb occurrence within the VP, but in fact such reliance on transportability is problematic, as it incorrectly predicts occurrence of adverbs between V and the direct object, and allows across the board initial appearance of all adverbs, though such is clearly not the case.

A more recent interpretation by Ernst (1984) builds on Jackendoff's use of semantic projection rules as well as the largely associationist work by McConnell-Ginet (1982) to offer an almost wholly semantic interpretation that resolves the issues of clausal-manner ambiguity. In McConnell-Ginet's analysis, adverbs with the ability to attach to either S or VP are considered to be lexically identified as VP- attaching, but are linked to their associated S occurrence through a word-formation rule that introduces a 'higher' verb to be modified in cases of VP attachment. Ernst builds on the idea of lexical unity of higher and lower occurrences and introduces a paraphrase for both readings.

(32) The agent can be judged ADJ because of α

In this paraphrase, α can encompass grounds for judgement on either reading. If the S reading is warranted, α = the situation, while if the VP reading is appropriate, α = some aspect of the situation. To assign the correct value for α , one need only look at the node dominating the adverb.



In the first case, S dominates *tactfully*, giving α a value equal to the situation and therefore yielding a clausal reading. In the second case, VP dominates *tactfully* giving α a value equal to some aspect of the situation and thereby a manner reading.

In his later work, *The Syntax of Adjuncts* (2002), Ernst further develops his initial semantic interpretation and proposes a theory based on selectional restrictions of adverbs. According to this later analysis, adverbial distribution is determined by the interaction of four components: the lexico-semantics of adverbs, which specify the type of semantic objects (speech act, proposition, fact, event, spec event) that an adverb can take in its scope; a compositional-semantics rule system that layers events one on top of another to build a representation of the complete sentence; weight theory, which states that certain constituent orders are preferred based on weight; and directionality principles that govern phrase-structure construction.

Contra Cinque, Ernst argues that adverbs are adjuncts that almost always freely adjoin, rather than being generated in one or two positions and moving to Spec. He allows adverbials in any position where they can be appropriately interpreted by semantics. However, this is not to say that no distributional restrictions exist, but rather that semantic compositional rules operate over certain clausal positions and that some distributional restrictions are best expressed in terms of lexically encoded semantic selectional restrictions.

His use of semantic typing of adverbs is similar to Jackendoff's. However, Ernst, rather than specifying an interpretation rule that applies to certain nodes in a tree, argues that

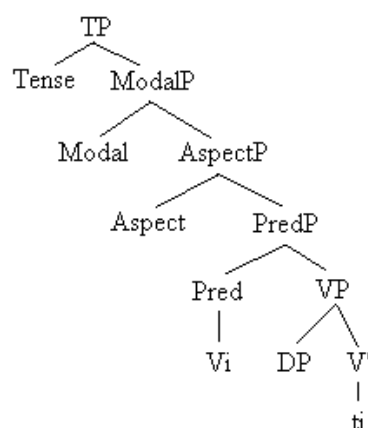
adverbs select for a specific type of semantic argument (a proposition or an event). As adverbs combine with their arguments (the agent and proposition or event), they form an element of a specific type, which is then selected for by other elements of the sentence, such as modals and negation. Only if each element is of the correct type to combine with the next successive element in the tree will the sentence be grammatical.

In resolving clausal/manner ambiguity, Ernst proposes an analysis under which manner adverbs do not exist as a lexically defined class, but rather are a collection of derived interpretations of adverbs whose default reading is clausal. The manner reading is arrived at through application of the Manner Rule, which acts to narrow the comparison class for the event argument of the adverb. Using Davidsonian event semantics, Ernst provides a semantic representation of subject-oriented adverbs that allows for manner interpretation.

- (34) a. She cleverly has been opening the boxes.
[O(e) & Agt(e,she) & Th(e,b) & Clever(e, she)]
where e is mapped onto a scale of cleverness evaluated with
respect to the comparison class of all events
- b. She has been opening the boxes cleverly.
[O(e) & Agt(e,she) & Th(e,b) & Clever(e*,she)]
where e* is mapped onto a scale of cleverness evaluated with
respect to the comparison class of all events of opening
(Ernst 2002, 117)

To restrict manner interpretations to adverbs that occur in the lower portion of the clause, Ernst stipulates that the rule deriving (34b) applies only to adverbs occurring in PredP, assuming a structure in which V moves from VP to the head position of PredP.

(35)



Theoretically, *cleverly* could adjoin anywhere in the tree. When it adjoins above PredP, it will take its clausal reading, but when it adjoins within PredP, and only then, will it have a manner reading.

Ernst's analysis is perhaps the most restrictive and accurate to date. However, its reliance on transformations and heavy stress on the role of semantics in determining adverb syntax violates the major understandings informing this paper. The present analysis focuses on the role of syntax in determining semantics, using a feature-based treatment and LFG framework.

As argued above, both Jackendoff and Ernst miss the mark in their concentration on semantic considerations. It is not the meaning, but rather the function that interacts with and informs the syntax of adverbs. Their maintenance of a transformational system disregards functional information, which the present analysis argues is fundamentally necessary for proper treatment of the issue. This paper, therefore, abandons the transformationalist framework in favour of the more function-friendly Lexical Functional Grammar (LFG). Before exploring the capabilities of LFG to capture the necessary

aspects of adverbial syntax, let us first see what a functional treatment of adverbs looks like.

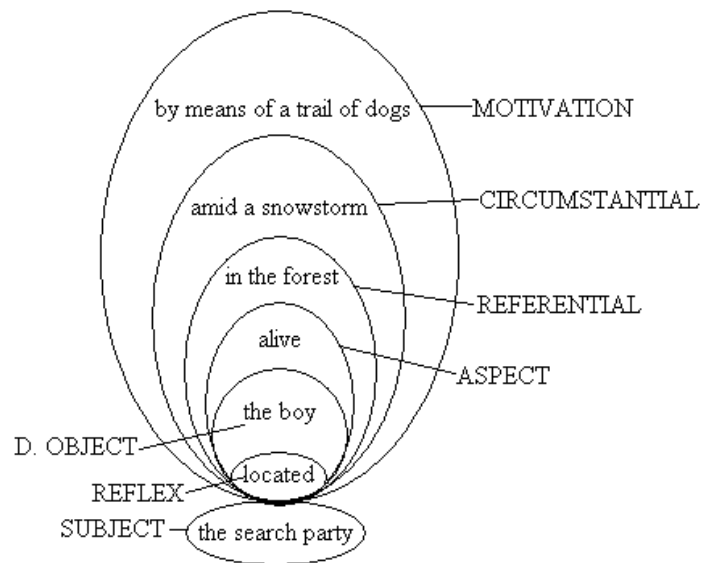
2.4 Functional Adverbs

In a departure from both semantically and syntactically oriented theories of adverbial positioning, Richard Hodge describes the relation of adverbs to an underlying, or as he says ‘supra-lexical’, functional structure (Hodge 1976, v). He develops a syntactically and semantically supported hierarchical classification consisting of several major functional classes, each of which is subdivided into functional sub-classes, which may then also be further sub-classified. This functional structure, by which he means, ‘relationships like subject, verb, direct object, time, place, manner, means, etc, along with the knowledge of how these functions are interrelated’, he argues, is essential to understanding the meaning of a sentence, particularly one involving adverbs (Hodge 1976, 17).

Hodge describes sentences as having the possibility of containing seven functions – SUBJECT, REFLEX, DIRECT OBJECT, ASPECT, REFERENTIAL, CIRCUMSTANTIAL, and MOTIVATION – that represent real and physical components of semantic structure (48). SUBJECT and OBJECT are both self-explanatory, REFLEX is the verb, and the latter four are functions ascribed to adverbs. While a sentence can contain all seven functions, such an occurrence is unlikely. The key to meaning is the hierarchical arrangement of the functions, in which each outer function has scope over those occurring more centrally.

Hodge illustrates his hierarchy with diagrams showing scope.

- (36) a. The search party located the boy alive in the forest amid a snowstorm by means of a trail of dogs.



(Hodge 1976, 48)

According to Hodge, no linearity is implied, but the diagram corresponds to ‘the way man must organize his thoughts’, with the outer functions making a predication on or assertion regarding the other inner functions taken as a whole (49). This dependence of one element’s interpretation on those preceding, in a nesting-of-meaning fashion, foreshadows Ernst’s (2002) scope-based analysis, but is differentiated by the lack of reference to event semantics. Rather, Hodge relies on the functional relations between elements and the relations incurred in linear order.

In Hodge’s analysis, only SUBJECT, REFLEX, and DIRECT OBJECT are invariant within a language, their order being determined by the SOV or SVO nature of the particular language. The crucial point is that the other functions, those that attach to adverbials, take variable order and therefore variable scopes. The order is not fixed, but rather determined by the word order within the sentence, the functions being a specification on the words themselves and only arising from their use. This represents a kind of reversal of the logic of the Association Theory, which seems to propose the independent attachment of adverbial classes to specific positions in the syntactic tree. The words

themselves only come after and as a result of the class specification for Cinque, Jackendoff, and others, whereas in Hodge's theory, the words carry the specifications within themselves.

According to Hodge's classification, manner adverbs, and in fact nearly all *-ly* adverbs, function as part of ASPECT, as they describe 'some facet of an entity....[that is] proper to the entity per se and never includes relationships of the entity to other entities' (55).

ASPECT divides into two major classes, STATE, which asserts that some aspect is present in an entity, and MANNER, which asserts that some aspect of an entity is reflected in the REFLEX/EXPANDED REFLEX (equivalent to the reflex plus any functions with which it has already combined) (56). With this definition in mind, Hodge asserts that traditional 'manner' adverbs, as found in (19a), below, are not predicated of the REFLEX, but rather of the SUBJECT as suggested by the paraphrase in (b).

- (37) a. Ellen dances gracefully.
b. Ellen is graceful in her dancing.

He argues that saying that *gracefully* describes the 'manner' in which Ellen dances fails to provide 'an explicit statement as to what "manner" is' (Hodge 1976, 55). In the adjectival equivalent in (37b), *graceful* describes an aspect, a trait, of Ellen, making Ellen what Hodge calls 'the referent' – the entity of which some aspect is predicated or asserted. In (37a), *gracefully* is predicated of *dances*, yet Hodge states that the referent in (37a) is not *dances*, but *Ellen*, because 'whenever an aspect can be attributed to the head entity in SUBJECT, or...in DIRECT OBJECT, it will have that entity as its referent' (Hodge 1976, 57). This is a direct result of Hodge's idea that REFLEX is only an abstraction perceived through the behaviour of entities and that an action alone cannot be

the source of an aspect or trait that can only be seen in the person performing the action, not the action alone (Hodge 1976, 57). The aspect is not revealed directly by the referent or through the action alone, but rather is displayed by the referent as mediated by the action. Couched in ideas of functional relations, Hodge's argument that manner adverbs are predicated of the SUBJECT rather than the REFLEX points up the complications inherent in dividing adverbs into classificatory subgroups and opens up the possibility of working at the syntax-semantics interface by dealing with neither distributional properties nor semantic scope alone, but rather with function, a combination of meaning- and position-based relation to the remainder of the sentence.

Hodge's extensive classification of ASPECT into over 100 different functional sub-classes divides adverbs based on their relation to the arguments of the sentence in which they appear. While his analysis does describe the source of clausal/manner ambiguity in his own terms, Hodge does little to resolve the issue or to relate its occurrence to position in constituent structure. In fact, Hodge largely avoids constituent structure in favour of functional structure and makes little effort to discuss the relation between the two other than to state that they are in fact related. He does not propose a tree showing the linkage between ASPECT and its referent, but does 'suggest that in actual performance this procedure must not be so cumbersome as to involve an independent S and then a transformation' (Hodge 1976, 60).

In further discussing the ability of some adverbs to predicate over either the entire sentence or merely the verb, Hodge argues that the difference in meaning issues from a difference in scope and referent, which can both be traced to membership in different sub-classes. In (38a), *obviously* belongs to what Hodge calls the ESSENCE (what a thing is by

nature) sub-class, while in (38b), *obviously* is a TRAIT (a characteristic which is ascribed to an entity as a result of observing its behaviour) (Hodge 1976, 138).

- (38) a. Obviously, the quarterback fumbled the ball.
b. The quarterback fumbled the ball obviously.
c. It occurs as an obvious thing, the quarterback fumbled the ball.
(Hodge 1976, 138)

Membership in ESSENCE designates that *obviously* in (38a) takes an underlying *it* as referent and an underlying *occurs* as its scope, as in (38c), whereas in (38b), as a TRAIT, *the quarterback* is the referent and *fumbled the ball* is the scope (138). The concept represented by *obviously* remains constant; it is only its functional meaning, its relation to the other entities in the sentence that changes and hence renders a different interpretation. Hodge further argues against positional determination of meaning when he states that though ‘position of occurrence serves to indicate type of verbal mediation for TRAIT...there is almost no correlation for most sub-class distinctions per se. The listener must disambiguate through context’ (Hodge 1976, 147). He does state in a footnote, however, that the preferred reading for pre-verbal position is clausal rather than manner (Hodge 1976, 169), though this position is only derived through transformation, as is sentence-final position. The only position generated in the base is immediately pre-verbal. Because Hodge’s work focuses on functional meaning and structure rather than syntax, he does not provide an explanation for this, but simply assumes it.

Hodge’s work is unquestionably useful for understanding adverbs both syntactically and semantically, outside of the transformational framework. Though his understanding of syntax is largely transformational, he does acknowledge many of the same faults mentioned above, but does not go so far as to propose an alternative syntactic theory that

could more adequately incorporate the functional information he so painstakingly lays out.

In fact, it is precisely analyses like Hodge's that makes transformational grammar seem inferior in the treatment of adverbs. Quite obviously, the information contained in the functional structure is crucial to the interpretation of adverbs in various syntactic positions and cannot be overlooked in any theory attempting to correctly restrict and predict their distribution. Lexical Functional Grammar (LFG), with its assumption that functional syntactic concepts are necessary for analysis of language in general, seems more than sufficiently suited to a holistic approach to adverbs.

2.5 Summary

From our point of view, the Transformational, Associative, and Derivative accounts of adverb syntax all fall short. Transformationalism requires too many transformations that are otherwise unnecessary in the grammar to create adverbs from adjectives at its worst and risks a total lack of differentiation between adverb and adjective as grammatical categories at its best. Association theories overcomplicate the grammar with numerous extraneous nodes of attachment without providing any additional specificity, and derivative theories like those of Jackendoff (1972) and Ernst (1984, 2002) rely too heavily on the role of adverb semantics in determining the syntax of adverbs, mistaking interactions with function, which this paper argues for, for interactions with meaning, which are in fact a semantic issue and should not be brought into issues of syntax. We have, however, found a basis for our analysis in Hodge's (1976) functional analysis of adverbs, which has provided a starting point for a grammar of adverbs that relies upon functional interactions between adverbs and other arguments of the sentence to determine

their syntactic positions. It is this understanding of the importance of the functional properties of adverbs that leads us to construct an LFG analysis of adverbial syntax.

3. Theoretical Framework and Assumptions

This paper proposes to formulate an LFG-based grammar of adverbs in English, in which functional structure is used to represent syntactic predicate-argument structure and to provide the structure necessary to resolve meaning ambiguities that arise from structural ambiguities. Phrase-structure rules and functional annotations are used to restrict adverb occurrence to only those places where they can grammatically occur.

LFG proposes that the best representation of syntactic structures correlates the concrete, linear, hierarchical aspect of language with a more abstract level of functional organization, assuming an inventory of grammatical functions such as subject and object. The concrete phrase structure is depicted by the constituent or c-structure tree, which is related to the abstract functional or f-structure through functional notation. While other structures, such as information structure have been proposed in the literature (see Butt and King 2000, among others), the present analysis requires only c- and f-structures.

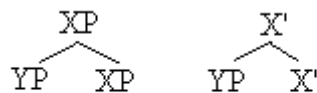
Following Dalrymple (2001, 52), this paper assumes the following lexical categories for use in c-structure, each of which heads a phrase of the same category: N(oun), P(reposition), V(erb), Adj(ective) and Adv(erb). This paper also assumes, following Dalrymple and others, functional phrase structure categories of I and C, with tensed auxiliaries filling I in English, and C taking either a verbal element or complementizer (Dalrymple 2001, 53-54).

C-structures are built up according to X-bar theory, with the maximal projection XP (equivalent to X'') dominating a non-maximal X', which then itself dominates a lexical

item at the level of X. In keeping with standard LFG, this analysis does not assume binary branching, but rather allows an X' node to dominate any number of daughters.

Additionally, this analysis assumes what is often referred to as 'Chomsky-adjunction', in which a maximal phrase is adjoined to either a maximal or non-maximal projection such that it is both daughter and sister to phrases of the same projection level, that is, one level higher than itself.

(39)



Both left and right adjunction are allowed.

C-structures built up in this way are accompanied in the analysis by f-structures illustrating functional information and relating to the c-structure through functional notation. This analysis assumes the following grammatical functions:

(40) SUBJ, OBJ, COMP, OBJ_θ, OBL_θ, ADJ, XCOMP, XADJ

In English, SUBJ refers to the subject, OBJ to the direct object, COMP and XCOMP to a complementizer, OBJ_θ to the indirect object, OBL_θ to a prepositional phrase, and ADJ and XADJ to optional modifiers (Dalrymple 2001, 25). COMP, XCOMP and XADJ are clausal functions, correlating to phrases such as *that he liked*, *to go*, *how green the grass was*, etc., with XCOMP and XADJ functions requiring an external subject. ADJ contains optional modifiers, whether they be a single adjective or adverb or a multi-word

adverb/adjective or adverb/adverb combination, eg *quite large*, or *very slowly*, a prepositional phrase such as *in the kitchen*, or a subordinate adverbial clause like *because it was raining*. The important difference between ADJ and XADJ is that XADJ requires specification of an external subject and will always be clausal, while ADJ may or may not be clausal, and will have an internal subject when necessary.

F-structures are represented by attribute-value matrices in which functionally significant information is listed in conjunction with specific values drawn from the appropriate lexical entry such that the grammatical relations of the sentence are displayed. Semantic forms are displayed as the value of the attribute PRED, for predicate. The PRED accorded to the semantic value of the main verb of the sentence is the ‘head’ of the main f-structure of a sentence, and displays the verb’s subject, object, and other subcategorization requirements along with its semantic value. A simple f-structure for the sentence *Chris walked* is given below.

(41) Chris walked.

$$\left[\begin{array}{l} \text{PRED } 'WALK\langle \text{SUBJ} \rangle' \\ \text{TENSE } \textit{PAST} \\ \text{SUBJ } [\text{PRED } 'CHRIS'] \end{array} \right]$$

The presence of SUBJ inside angled brackets following the semantic value ‘WALK’ indicates the verb’s requirement for a subject. Here, as elsewhere, it is assumed that all the information listed in the given f-structure is present in the sentence, but the possibility that the f-structure can be expanded to contain additional information, for instance attributes of person, number or gender, is not excluded. Only the attributes relevant to the point being made will be displayed, so as to avoid unnecessarily complicated structures.

The relationship between a sentence's c- and f-structures is formally stated through functional annotations on the phrase structure rules. Upward pointing and downward pointing arrows are used to refer to f-structures corresponding to mother and daughter nodes respectively, and grammatical functions are listed in the annotations. A simple phrase structure rule from English is provided below.

$$(42) \quad IP \rightarrow \quad NP \quad VP \\ \quad \quad \quad (\uparrow \text{SUBJ})=\downarrow \quad \quad \uparrow=\downarrow$$

The above rule displays the simple 'noun phrase followed by verb phrase' construction used in sentences such as (41) above, *Chris walked*. The annotation below the NP indicates that the f-structure for the NP is the value of the SUBJ of the mother node, the IP, with \uparrow referring to the mother IP and \downarrow referring to the daughter NP. The annotation below the VP states that the mother and daughter correlate to the same f-structure.

Additional f-structure attributes and values are obtained from lexical entries, using similar notation. A sample lexical entry for 'walked' is given below.

$$(43) \quad \text{walked} \quad V \quad \begin{array}{l} (\uparrow \text{PRED}) = \text{'WALK<SUBJ>'} \\ (\uparrow \text{TENSE}) = \text{PAST} \end{array}$$

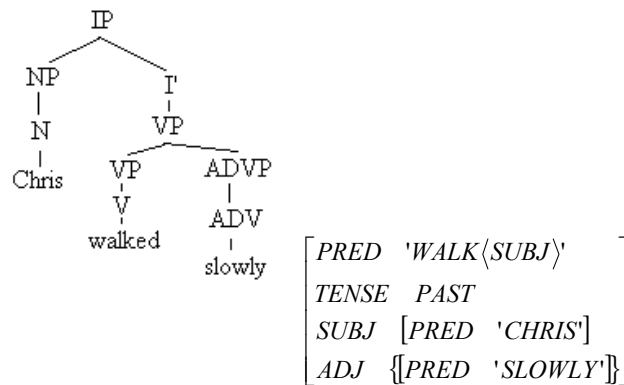
The lexical entry states that the f-structure corresponding to the V node immediately dominating 'walked' has an attribute PRED whose value is 'WALK<SUBJ>', and an attribute TENSE whose value is PAST. This corresponds to the f-structure already given in (41), less the attribute-value pair for SUBJ.

This framework, though described above in only a very basic format, provides the necessary tools to analyze the syntax of adverbs, specifically to delineate between clausal and manner uses of a single lexical form, by allowing access to both syntactic structure and lexical entry information at the same time in distinct yet connected structures. The

machinery and notation necessary for the description of adverbs will be expanded in the following section. First, however, we must address the current treatment of adverbs in LFG.

Though many works have been published on LFG and many studies done on various aspects of grammar in various languages within an LFG framework, little previous LFG work has attempted to treat adverbs. Both Dalrymple (2001) and Bresnan (2001) treat adverbs as adjuncts, though both concern themselves primarily with issues of control in XADJ constructions such as *Walking the dog*, *Chris saw David*. In fact, LFG literature that does address non-clausal adverbs tends toward the overly simple, placing them in ADJ, rarely with any attributes beyond PRED. A simple example is given below.

(44) Chris walked slowly.



Adjuncts are enclosed in curly brackets within f-structures to indicate their status as members of a set. Because a sentence can theoretically have any number of modifiers, set notation must be used even if only one modifier exists in a sentence. The c-structure displays the physical adjunction and shows through functional annotations on the nodes that the f-structure corresponding to the ADV serves as an ADJ modifier on the head of

the sentence, the verb *walked* in I. However, given the many functions of adverbs seen at the beginning of this paper, we contest that this description is insufficient.

3.1 Summary

We saw above that there is clearly some connection between an adverb's interpretation and its distribution, and while LFG provides an excellent framework in which such connections can be displayed, no such treatment has, to our knowledge, been developed to date. The c-structure and perhaps more significantly the f-structure used to describe the syntax of adverbial adjuncts remains drastically underdeveloped. While previous interpretations have debated whether it is the syntax that influences the semantics or vice versa, LFG's unique treatment of the interface between the two allows that argument to be dismissed in favour of a discussion of how the two can be simultaneously accessed and displayed in a formal way. While the present argument in no way claims to provide an even elementary semantic explanation, the hope is that it will, through LFG's reliance on lexically coded functional information and its application to syntax, provide a sufficient theory of the syntax to which semantics could be later added.

4. Analysis

We have seen above that distribution and semantics of adverbs are clearly related, yet none of the theories put forth have adequately described both in a single formalism to display their interrelation.

Both Jackendoff (1972) and Ernst (2002) fuel their discussions of adverbial distribution with evidence from adverbial semantics, first dividing adverbs into classes based on semantic features, then attempting to predict their syntactic behaviour from those classes. We have seen the ways in which this method, in both cases, fails to adequately address issues of clausal/manner ambiguity without adding significantly to either the syntactic or semantic component of the grammar.

The present argument proposes that rather than beginning with semantic categorization, we begin with syntactic distribution in order to formulate phrase structure rules. From there we will refine the grammar by adding functional annotations which we propose interact with information contained in the lexicon to yield correct c- and f-structures while disallowing ungrammatical constructions.

4.1 Phrase structure rules

Phrase structure rules must be formulated such that adverbs can appear on either side of the tensed auxiliary as well as sentence-finally. We shall see that the phrase structure rules necessary to licence adverbs in each of these positions are not drastically different from those already testified to as independently necessary for sentences without adverbs

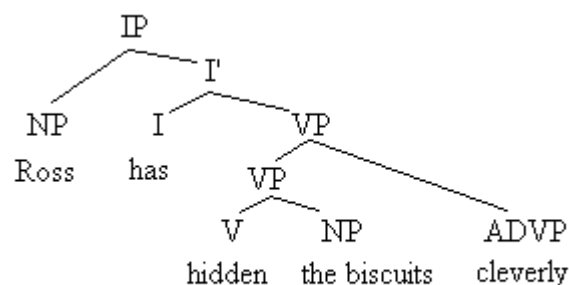
elsewhere in the literature and, for the most part, can be adapted to adverbial structures using simple adjunction. Starting with a basic set of rules, we employ Chomsky adjunction to insert adverbs at each of the positions mentioned above. We will require a unique treatment of tensed auxiliaries to allow I' adjunction to the right of the auxiliary, but that shall be explained in due course. The annotations, to be described later, will handle all restrictions for specific types of adverbs.

4.1.1 Sentence final

Sentence final adverbs adjoin to VP and so can be said to modify only the event or action of the clause. In this case, beyond adjunction, no additional rule to what would be used for a non-adverbial sentence is necessary, assuming that the language in question already necessitates the same constituents, as English does.

(45) Ross has hidden the biscuits cleverly.

$I' \rightarrow I \text{ VP}$
 $VP \rightarrow VP \text{ ADVP}$
 $VP \rightarrow V \text{ NP}$



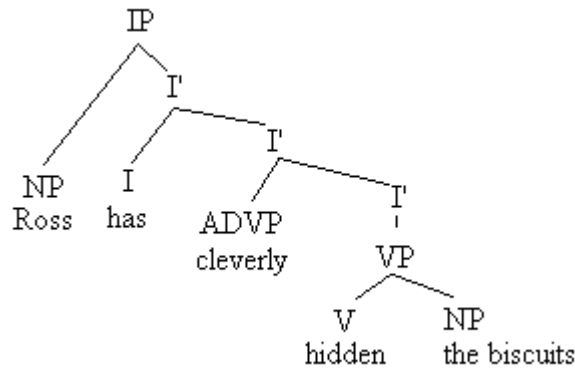
This is in keeping with, though terminologically different from, Jackendoff (1972), Ernst (2002), and McConnell-Ginet (1982). *Cleverly* is both daughter and sister to the VP and so can be said to directly modify the VP.

Adverbs occurring sentence-finally include *easily, purposefully, totally, handily, tightly, reluctantly, calmly, quickly, and accordingly*. Many of these will also be shown to occur on either side of the auxiliary. As the present analysis argues that ambiguity is resolved not in the c-structure, but rather in the f-structure, there is no need to differentiate between interpretations in the phrase structure rules or in the nodes of attachment, as previous theories have proposed. A similar structural ambiguity will be seen with adverbs occurring in the auxiliary and will again be resolved not at c-structure but rather at f-structure. We will later propose lexical entries for these adverbs that allow them to occur in either position as appropriate.

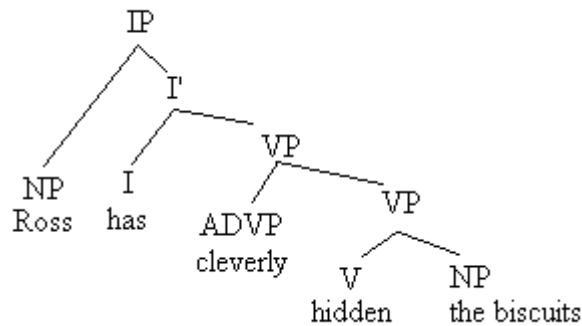
4.1.2 Auxiliary

The auxiliary is the most nearly universally acceptable position in which adverbs can appear. While this would seem to make it the simplest, it is indeed the most complicated as adverbs appearing in the auxiliary must be able to adjoin either to I' or to VP so as to allow modification either of the entire clause or only the event. As above, no special rules are required for adjunction to the left of the auxiliary. Adjunction to the right of the I' node, however, will require an unorthodox treatment.

- (46) a. I' Adjunction:
 Ross has cleverly hidden the biscuits.
 $I' \rightarrow I \quad I'$
 $I' \rightarrow \text{ADVP} \quad I'$
 $I' \rightarrow I \quad \text{VP}$

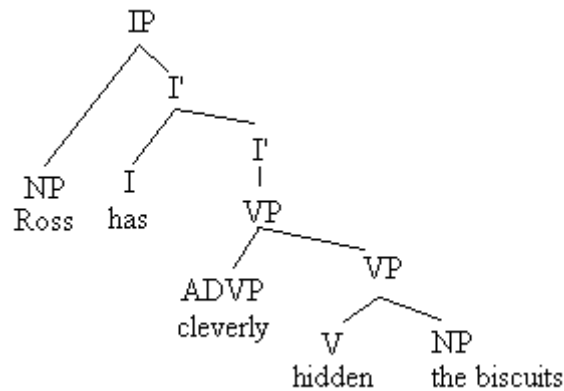


- b. VP adjunction : Ross has cleverly hidden the biscuits.
 $I' \rightarrow I \text{ VP}$
 $VP \rightarrow \text{ADVP VP}$



The use of I' as a headless category dominating VP is used here following Dalrymple (2001). The structure in (46a) does break with convention by featuring the auxiliary as an element adjoined to I', rather than as the head of IP. While a full exploration of the facts surrounding auxiliary verb placement is beyond the scope of this paper, we assume that it is, in fact, possible for auxiliaries to be adjoined to I'. In fact, we assume that it is possible that all finite auxiliaries are adjoined to, rather than the head of, I'. In this case, (46b) would appear like so:

(47)



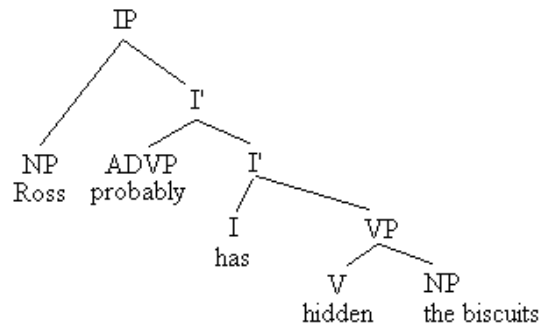
The auxiliary's contribution to f-structure will not be affected, as the $\uparrow = \downarrow$ annotation will remain the same and their c-structure position relative to the main verb will not change whether they adjoin to or head the category. It is clearly semantically and functionally necessary that adverbs occurring between the auxiliary and main verb be allowed to adjoin to I' and modify the clause rather than just the VP. 'It was clever of Ross to hide the biscuits' is an acceptable paraphrase of (46a). It is possible that all finite auxiliaries, as mentioned above, are adjoined to I', such that post-auxiliary occurrences of adverbs appear as in (46a) and (47), not as in (46b). However, a full exploration of auxiliary structure is beyond this paper's scope. From here on, we will, however, employ the VP adjunction structure in (46b), to maintain the possibility that either structure is theoretically possible.

While the vast majority of adverbs can appear between a single tensed auxiliary and the main verb, as above, attaching to either I' or VP, the picture becomes somewhat more complicated when considering complex auxiliaries.

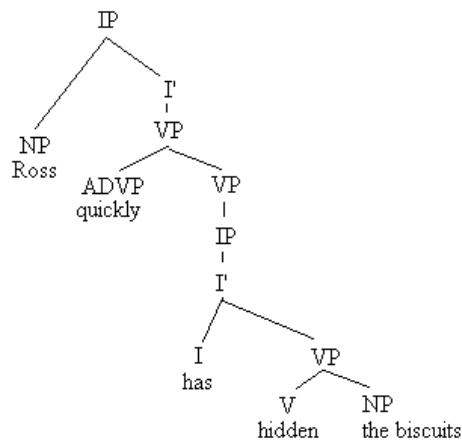
For instance, as Jackendoff (1972, 75) points out, an adverb occurring before an aspect, modal, or emphatic *do* must attach to S. In the version of X-bar theory we have employed, this rule translates to I' attachment before aspect, modal, or emphatic *do*.

(48) Ross probably/*quickly has hidden the biscuits.

a.



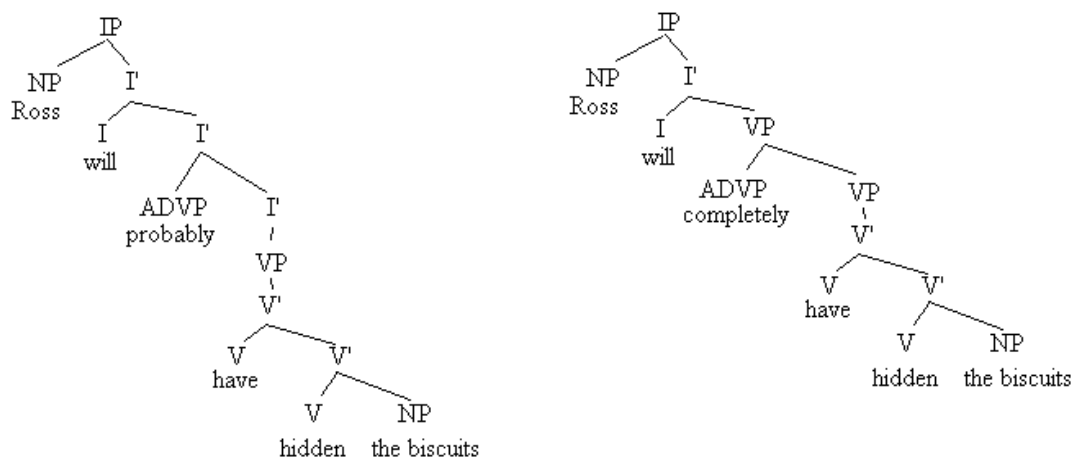
b.*



If, as shown in (48b), an adverb occurring before the auxiliary verb is to adjoin to VP, and if the tensed auxiliary must occur in I, as in LFG it must, then the second VP would need to dominate a second IP to project the I in which the tensed auxiliary must appear – a construction not elsewhere necessitated or attested to in English and one we will not argue in favour of. It seems likely, then, that an adverb occurring before a modal, aspect or emphatic *do* must attach to I'. This restriction will be seen to fall out naturally from our grammar and will be discussed in greater depth in Chapter 5.

An I' attachment is also strongly favoured for adverbs occurring between two auxiliaries (Jackendoff 1972, 75), though the present analysis allows for both.⁸

(49)

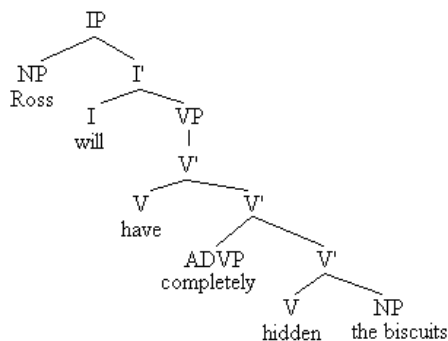


In the first case, *probably* adjoins to I', which is then in its second instance a headless category dominating VP, while in the second, *completely* adjoins to the VP dominated by I'.

Finally, an adverb occurring after two or more auxiliaries can only adjoin to VP.

Adjoining to I' is impossible as non-tensed auxiliaries must occur in V.

(50)



⁸Evidence for the acceptability of a VP attached adverb between two auxiliaries has been found by the author on a Google search of the internet.

All of these multiple auxiliary constructions, as well as some other interactions between elements in a sentence, will be discussed in greater depth and resolved in Chapter 5.

We have shown that it is possible to construct c-structures for all acceptable adverb positions using standard phrase structure rules necessary for non-adverb sentences simply by allowing adjunction to I' either to the left or right of I and either left or right adjunction to VP.

A summary of the condensed phrase structure rules necessary for adverbs is as follows. Under the economy of expression principle, all nodes expressed in LFG rules are optional. Kleene star notation is used, as typically, to denote the presence of the starred node zero or multiple times in the given position.

- (51) IP \rightarrow NP I'
I' \rightarrow I VP
VP \rightarrow V (NP)
VP \rightarrow {ADVP* VP |
 VP ADVP*}
I' \rightarrow I I'
I' \rightarrow ADVP* I'
VP \rightarrow V'
V' \rightarrow V VP

While these rules account for the positions in which adverbs as a broad category can occur, they do not mitigate against occurrence of any specific adverbs in unacceptable positions, e.g. *probably* in sentence-final position, etc. That burden shall be placed on the functional annotations.

4.2 Lexical Entries

In LFG, functional annotations are used in conjunction with basic phrase structure rules as a means of relating the c- and f-structures. Our analysis uses functional annotations as constraints on adverb distribution, preventing certain types of adverbs from occurring in positions that are acceptable only for other types of adverbs.

However, before specifying the functional annotations necessary to adequately constrain adverb occurrence, we must propose lexical entries for adverbs that will provide useful information in the f-structure.

Following Laenzlinger (1996) and others, the present analysis pursues a kind of feature-based analysis of adverbs. Rather than proposing, as Jackendoff (1972), Ernst (2002) and others do, that adverbs fall into categories based on their syntactic distribution or semantic properties, we propose that adverbs already contain within their lexical entries a functional typological designation inserted into f-structure that can be used to properly predict their occurrence in c-structure.

Designation of semantic classes, or types, of adverbs has proven an unruly task for most previous theorists. Because the present analysis focuses not on semantic properties, but on syntactic distribution, we will, rather than formulate a unique typological system, adapt one from Ernst (2002).

Ernst (2002) proposes three broad categories of what he calls ‘predicational’ adverbs, which he distinguishes from domain, participant and functional adverbs on the grounds

that predicationalals make a further specification on some already existing argument of the sentence and are more often a single, typically *-ly*, word, while the other classes do not relate directly to an argument of the sentence and commonly occur as phrases. Within the category of predicational, he further specifies four sub-categories, three of which are then, in turn, further broken down into classes. Adverbs are slotted into a given class according to the way in which they combine with other semantic elements of the sentence. The four sub-categories of predicationalals and their classes are as follows:

(52) Subject-oriented:

Agent oriented: *cleverly, wisely, stupidly, rudely, secretly*

Mental attitude: *reluctantly, calmly, eagerly, gladly*

Speaker-oriented:

Speech act: *honestly, frankly, roughly, seriously*

Epistemic: *probably, clearly, obviously*

Evaluative: *unbelievably, unfortunately, surprisingly, oddly*

Exocomparative: *similarly, accordingly, equally, differently*

Event-internal: *tightly, partially*

Ernst does not address ‘manner’ as a category or class unto itself, but rather demotes it to simply a reading that some adverbs can take when induced by a semantic operation he refers to as the ‘Manner Rule’ as discussed briefly above. While his proposal is interesting, it does not warrant extensive explication here. We shall simply state that we do not accept the abolition of manner as a category, class or type and shall include it in our analysis, as it seems to have a clear influence on distribution. Even Ernst acknowledges the distributional significance of the category, stating that only those adverbs able to take manner readings can occur to the right of the main verb in English. Furthermore, he states that there is a ‘hard core of pure manner adverbs’ that can take only the manner reading, of which he gives ‘tightly’ as an example (Ernst 2002, 44). It seems to us counterintuitive to recognize the existence of a set of adverbs bound together

by their ability to serve only one purpose in a sentence, and thereby to be distributionally restricted, and then to refuse to formalize that set as a class or category.

The present analysis shall adopt not Ernst's categories, sub-categories or classes, but rather, to enable the inclusion of 'manner', the various 'readings' of adverbs he groups together. Only the inclusion of discourse-oriented and manner separates readings from the classes given in (52) above. The classes given in (52) are determined on the basis of how they combine with other semantic arguments. Though Ernst does not justify his inclusion of manner as a possible reading while excluding it as a defined lexical class, if his explanation of the reasoning behind the 'Manner Rule' is taken into account, his argument implies that the 'readings' are based not specifically on the means of combination with semantic arguments, as classes are, but rather on their interpretation within the context of the sentence and perhaps the discourse as a whole. After all, in his argument, manner readings are derived from subject-oriented adverbs interpreted with respect to a more specific event. We shall employ Ernst's readings in a way close to that for which he intends them. In his analysis, it is adverbs' 'readings' that interact to create the strict relative ordering that predicational exhibit. By using them in the f-structure and accompanying functional annotations, we remain true to their spirit, though not to their intended use as semantic designations with scoping properties. The readings Ernst proposes are as follows:

The TYPE designation specifies that the above element will have a TYPE which is an element of the set containing MANNER and SUBJ-O. This rule could also be expressed as a disjunction between two TYPE equations.

$$(57) \quad \text{cleverly} \quad \text{ADV} \quad (\uparrow\text{PRED}) = \text{'CLEVERLY'}$$

$$\quad \quad \quad \quad \quad \quad \quad \quad \quad \{(\uparrow\text{TYPE}) = \text{MANNER} \mid$$

$$\quad \quad \quad \quad \quad \quad \quad \quad \quad (\uparrow\text{TYPE}) = \text{SUBJ-O}\}$$

Though the TYPE representations in (56) and (57) will result in the same f-structure, we shall use the notation in the former. The disjunction between two full TYPE equations in (57) would make sense if the two equations featured different attributes, one TYPE and one something else, for example, but as the only choice is between two different values for the same attribute, and as it is notationally simpler, we shall use the notation in (56) designating whatever TYPE surfaces as one of a set of possible types inherent in the adverb.

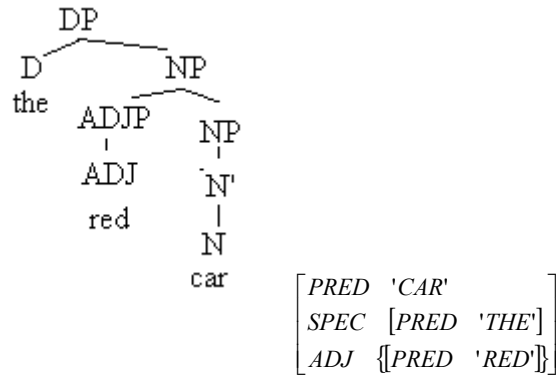
4.3 Functional Annotations

In LFG, functional annotations are used in conjunction with basic phrase structure rules as a means of relating the c- and f-structures. Our analysis uses functional annotations as constraints on adverb distribution, preventing specific adverbs from occurring in positions that are more generally acceptable.

It was demonstrated above that by using common phrase structure rules and simple adjunction, we can easily formulate sentences with adverbs in sentence-initial, sentence-final, and a variety of auxiliary positions. However, we have also seen that not all adverbs are permissible in all positions. We must then add to the grammar in such a way as to restrict occurrence of each adverb to only those positions where it is grammatical.

In previous literature, annotations denoting adjunction have been minimal, typically indicating only that the daughter node is an adjunct of the mother node. Below is a sample of a c- and f-structure for an adjectival adjunct.

(58) the red car



The adjunct *red* modifies *car* and so is a sub-structure within the larger f-structure of *car*.

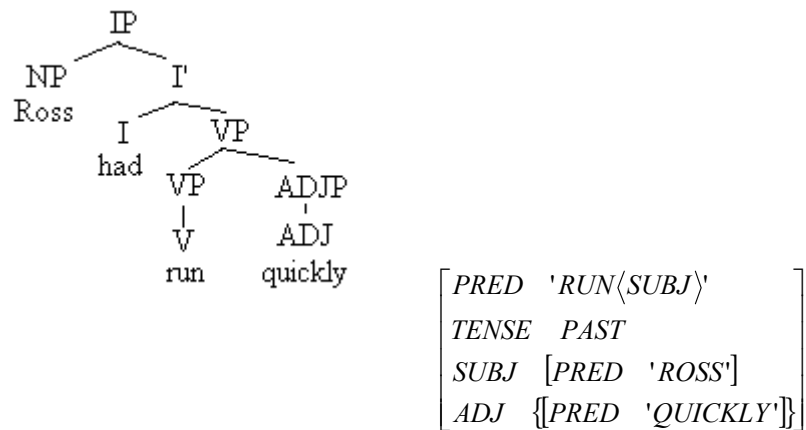
As a functional annotation, this would be stated as:

(59) NP → ADJP N'
 $\downarrow \varepsilon (\uparrow \text{ADJ})$

The annotation below ADJP indicates that the daughter node is an element of the set of adjuncts of the mother node, in this case, the NP, and so is contained within the f-structure associated with that node.

Similar structures can be used for adverbs, with the f-structure corresponding to the ADJ node being contained within the f-structure for the mother node, as indicated by the annotation. For example, the sentence *Ross had run quickly* would have the following c- and f-structures:

(60)



As in the adjective example in (58), the inclusion of the sub- f-structure corresponding to the adverbial ADJ *quickly* within the f-structure for the verb (and the sentence), indicates its role as a modifier of the verb. *Quickly* describes *run*. The PS rule, with functional annotation, would look like the following:

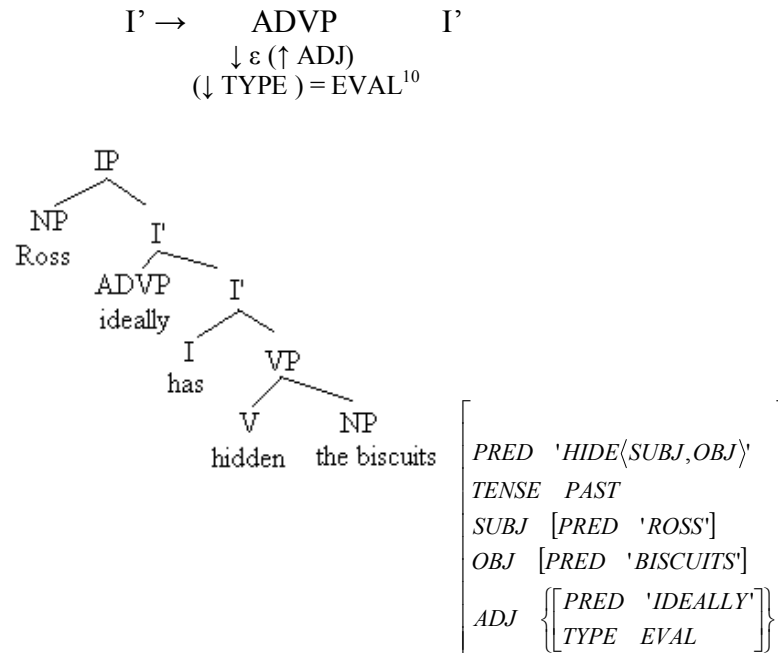
(61) $VP \rightarrow VP \quad (ADVP)^*$
 $\downarrow \varepsilon (\uparrow ADJ)$

However, addition of this annotation as it is beneath all ADVP nodes in the PS rules, would allow any adverb to appear in any of the positions proposed, which has been shown above to be incorrect. Distribution is more constrained and so the ADVP annotation must be refined. Using the types proposed to exist in the lexical entries for each adverb, we can so refine the annotations such that only those adverbs that are acceptable in any given position can occur there. The annotated PS rules for each type and position are given below with a brief explanation and example. The same types adapted from Ernst (2002) for lexical entries will be used in the annotations to be added to the PS rules given above.

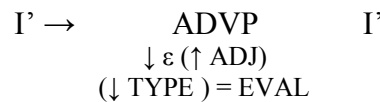
4.3.1 Evaluative

Evaluative adverbs modify the main clause and adjoin to I', to the left or right of I. They generally express the speaker's opinion regarding the situation described by the sentence.

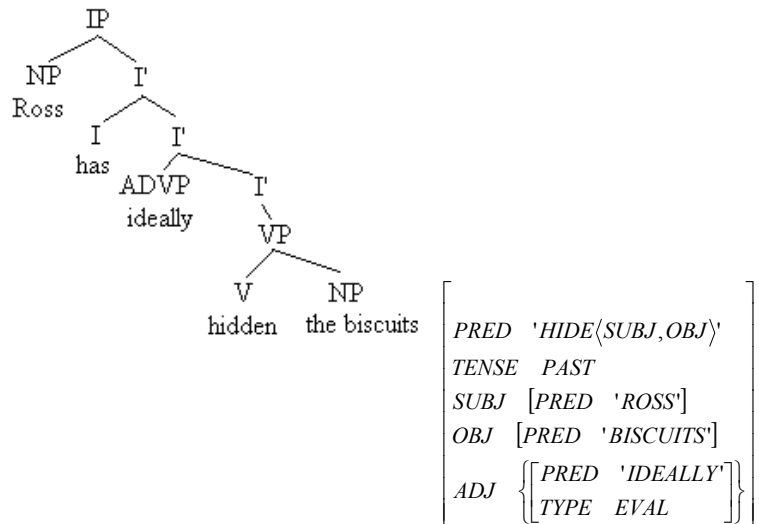
- (62) a. Ross ideally has hidden the biscuits.



- b. Ross has ideally hidden the biscuits.



¹⁰ This annotation, and those given in the following sections, were originally formulated using =c to denote the requirement that the adverb carry the relevant type. However, we have since decided that such an annotation would only be necessary if adverbs without any type were found to exist. As we do not promote the existence of any untyped adverbs in this paper, we have removed the =c annotation, but recognize that future work, should it find adverbs to exist that have no typological designation listed in their lexical entries, may necessitate its reinstatement.

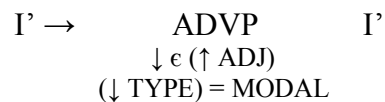


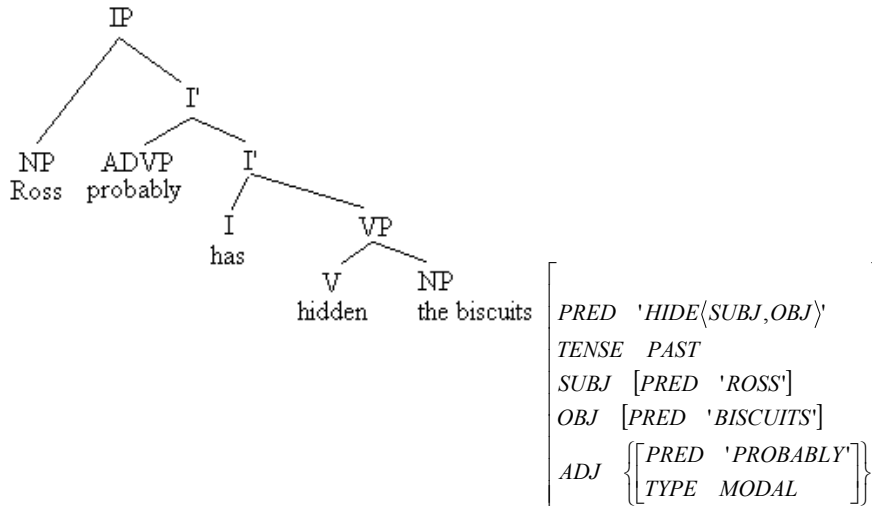
Because *ideally* performs the same function in each sentence, describing the speaker’s evaluation of Ross’ hiding of the biscuits, the f-structures for the two sentences will be identical, despite different c-structures.

4.3.3 Modal

Modality is one of the few adverb types that never overlaps with manner. It would not make sense to discuss the act of hiding, or any other act, as being done in a ‘probable’ manner. As only those adverbs taking ‘manner’ as a type can occur to the right of the main verb, modals must be restricted to I’ adjunction, to the left or right of I. Modals, similarly to evaluatives, express a judgment of the speaker, in this case regarding the likelihood or possibility of the situation occurring in the sentence.

- (63) a. Ross probably has hidden the biscuits.



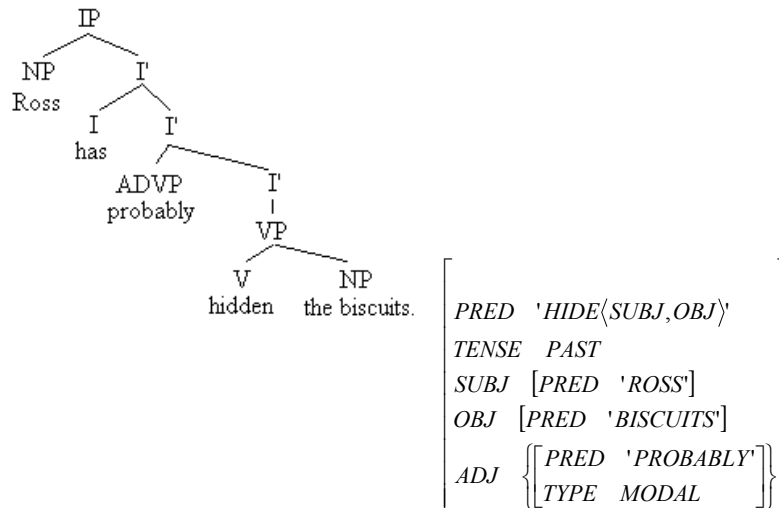


b. Ross has probably hidden the biscuits.

$I' \rightarrow I \quad I'$

$I' \rightarrow \quad ADVP \quad I'$
 $\downarrow \varepsilon (\uparrow ADJ)$
 $(\downarrow TYPE) = MODAL$

$I' \rightarrow VP$



Again, the two f-structures will be identical, despite different c-structures.

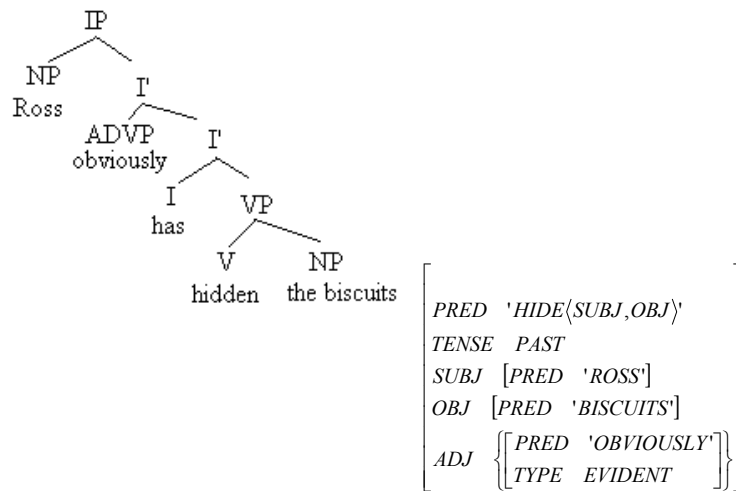
4.3.4 Evidential

Adverbs with the evidential type describe the clarity or obviousness of the proposition expressed by the sentence. Modifying a clause, they adjoin to I' to the left or right of I.

- (64) a. Ross obviously has hidden the biscuits.

$$I' \rightarrow \text{ADVP} \quad I'$$

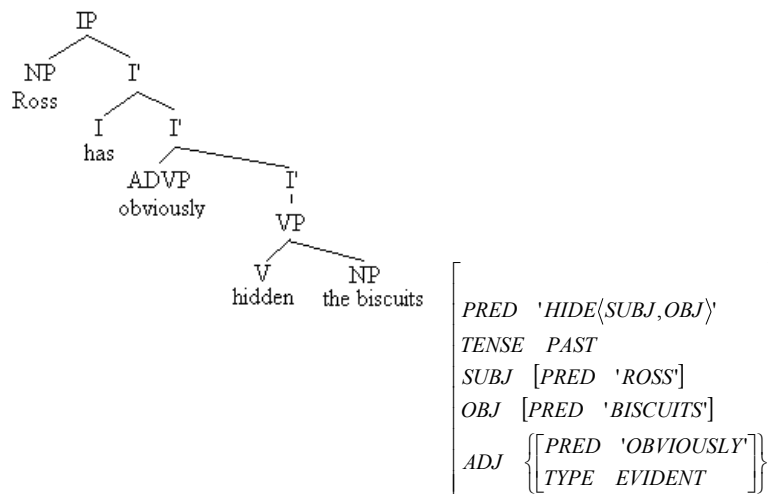
$$\downarrow \epsilon (\uparrow \text{ADJ})$$

$$(\downarrow \text{TYPE}) = \text{MODAL}$$


- b. Ross has obviously hidden the biscuits.

$$I' \rightarrow \text{ADVP} \quad I'$$

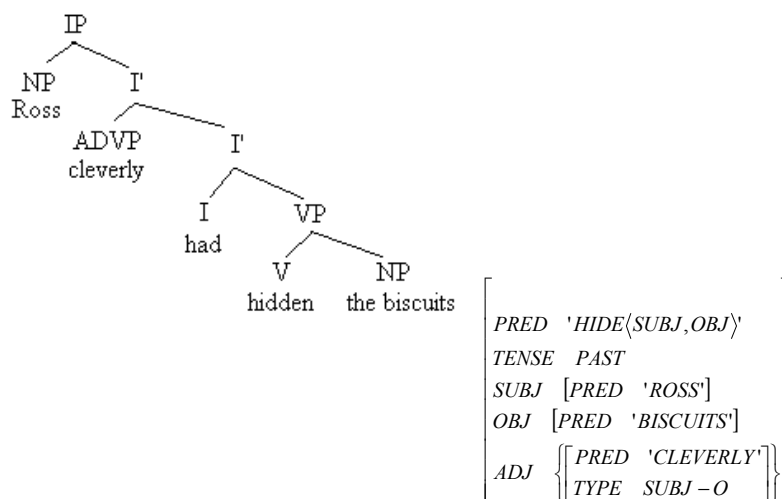
$$\downarrow \epsilon (\uparrow \text{ADJ})$$

$$(\downarrow \text{TYPE}) = \text{EVIDENT}$$


4.3.5 Subject-Oriented

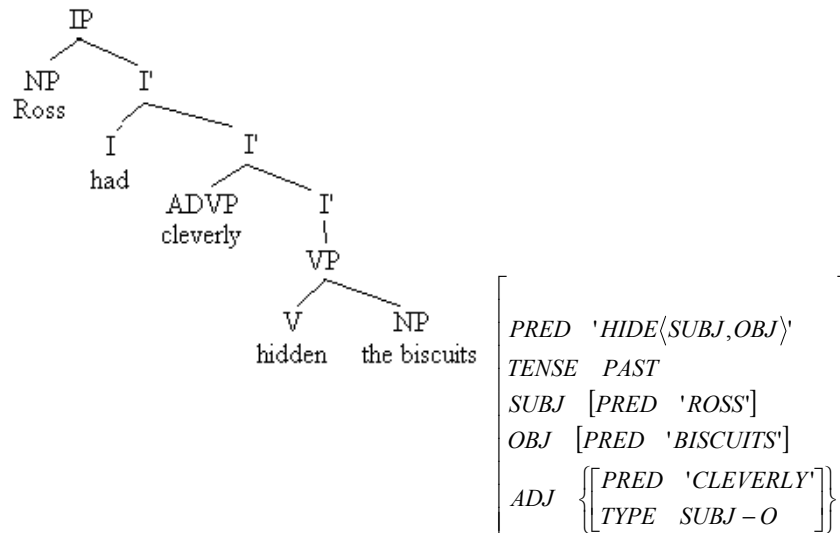
Adverbs bearing the subject oriented type describe the attitude, disposition or mental-attitude of the subject and attach to I' to the left or right of I. Subject-oriented adverbs almost always also bear the 'manner' type and so are often interpreted as being ambiguous when occurring immediately before the main verb, though less often when pre-auxiliary or sentence-finally where they are typically interpreted as subject-oriented and manner, respectively. Our grammar allows only subject-oriented interpretations in the pre-auxiliary position, only manner interpretations in sentence-final position, and either in the post-auxiliary position, as will be shown in the following section on manner adverb annotations.

(65) a. Ross cleverly had hidden the biscuits.

$$I' \rightarrow \begin{array}{c} \text{ADVP} \\ \downarrow \varepsilon (\uparrow \text{ADJ}) \\ (\downarrow \text{TYPE}) = \text{SUBJ-O} \end{array} \quad I'$$


b. Ross had cleverly hidden the biscuits.

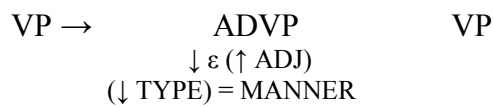
$$I' \rightarrow \begin{array}{c} \text{ADVP} \\ \downarrow \varepsilon (\uparrow \text{ADJ}) \\ (\downarrow \text{TYPE}) = \text{SUBJ-O} \end{array} \quad I'$$

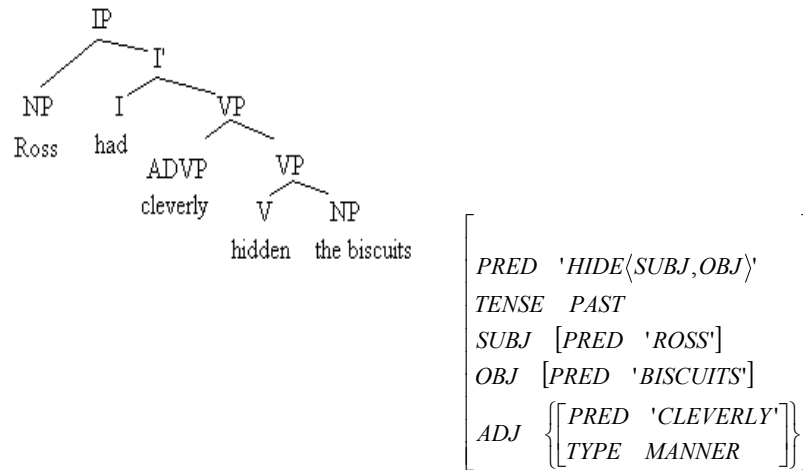


4.3.6 Manner

Manner is the most prevalent type both in terms of distribution and in the number of adverbs that have it in their lexical entry. Manner adverbs can occur after the last auxiliary and sentence-finally. Unlike subject-oriented and other adverbs, they will attach to VP when occurring in the post-auxiliary position, as they modify the VP rather than the clause and so should be sister to it. As discussed above, they describe the way in which the action of the sentence occurred.

(66) a. Ross had cleverly hidden the biscuits.



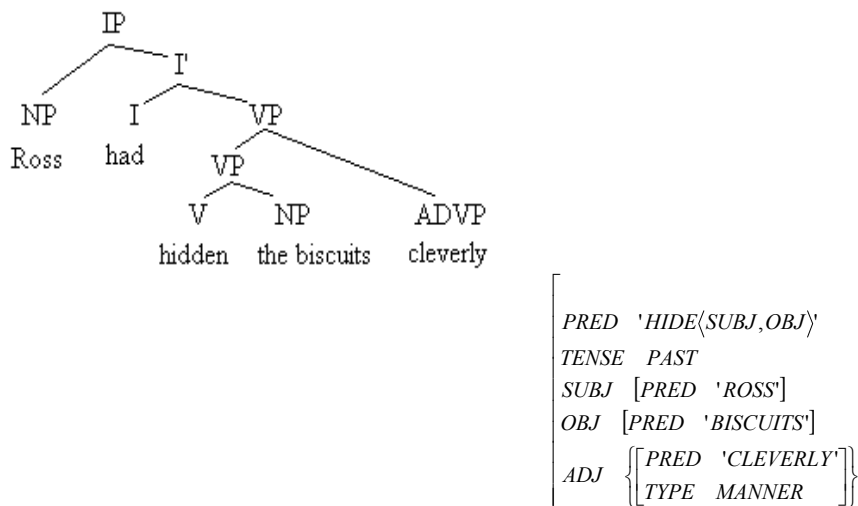


b. Ross had hidden the biscuits cleverly.

$$VP \rightarrow VP \quad ADVP$$

$$\downarrow \varepsilon (\uparrow ADJ)$$

$$(\downarrow TYPE) = MANNER$$



4.4 Summary

While it seems that we have developed a large number of individual rules by adding annotations, in fact, the rules can easily be condensed using disjunctions. For instance, both manner and subject-oriented type adverbs can occur in the post-auxiliary position, as above in (61b) and (62a). A disjunction in the annotation on each phrase structure rule

allows one of the multiple listed types to occur in the given position thereby greatly reducing the number of rules necessary.

The condensed rules would be as follows:

(67) I' adjunction rule:

$$\begin{array}{ccc}
 \text{I}' \rightarrow & \text{ADVP} & \text{I}' \\
 & \downarrow \varepsilon (\uparrow \text{ADJ}) & \\
 & (\downarrow \text{TYPE}) \varepsilon \{ \text{EVAL}, & \\
 & \text{SUBJ-O}, & \\
 & \text{MODAL}, & \\
 & \text{EVIDENT} \} &
 \end{array}$$

VP adjunction rules:

$$\begin{array}{ccc}
 \text{VP} \rightarrow \text{VP} & \text{ADVP*} & \\
 & \downarrow \varepsilon (\uparrow \text{ADJ}) & \\
 & (\downarrow \text{TYPE}) = \text{MANNER} &
 \end{array}$$

$$\begin{array}{ccc}
 \text{VP} \rightarrow & \text{ADVP*} & \text{VP} \\
 & \downarrow \varepsilon (\uparrow \text{ADJ}) & \\
 & (\downarrow \text{TYPE}) = \text{MANNER} &
 \end{array}$$

In the I' adjunction rule, the '=' in the TYPE equation has been replaced by 'ε'. This is simply a notational convention and denotes that the adverb type must be a member of the set shown. As shown above, using disjunction, all the necessary projection rules, correctly predicting and constraining the distribution of adverbs dependent on a lexically coded type can be expressed using only three rules. In fact, the VP rule can be condensed further, as below, to yield a total of only two rules.

$$\begin{array}{ccccc}
 (68) & \text{VP} \rightarrow & \text{ADVP*} & \text{VP} & \text{ADVP*} \\
 & & \downarrow \varepsilon (\uparrow \text{ADJ}) & & \downarrow \varepsilon (\uparrow \text{ADJ}) \\
 & & (\downarrow \text{TYPE}) = \text{MANNER} & & (\downarrow \text{TYPE}) = \text{MANNER}
 \end{array}$$

The two rules we have devised allow adverbs to adjoin to I' either to the left or right of I, and to VP, either to the left or right of the main verb V. In fact, this combined rule is better as it will allow less unnecessary ambiguity. While these rules license adverbs in

each of the permissible positions, pre- and post-auxiliary and sentence-final, and limit the interpretations a given adverb can have in any of these positions, in some cases completely prohibiting appearance of some adverbs in some places, as we will see below, they must be refined in order to convey the degree of specificity necessary to accurately license adverbs.

5.0 Refining the Grammar

Having established the basic framework for our grammar in the form of annotated PS rules that work with an assumed adverb typology to license occurrence of adverbs in various sentence positions, we must now refine our grammar to express further restrictions on adverb occurrence that arise from interaction either with other adverbs occurring in the same sentence or with certain types of auxiliary verbs, as well as simple cases of a finite main verb with no auxiliaries. We will first discuss occurrence with finite verbs, follow by interaction issues and their implications for our grammar as represented in the literature before proposing a resolution for such issues using principles of functional precedence, where necessary. We will then discuss the legitimacy of and structures necessary to accommodate the occurrence of one or more adverbs in succession in any given position in a sentence.

5.1 Data: *Finite Verbs and Auxiliary Interactions*

5.1.1 Finite Main Verbs

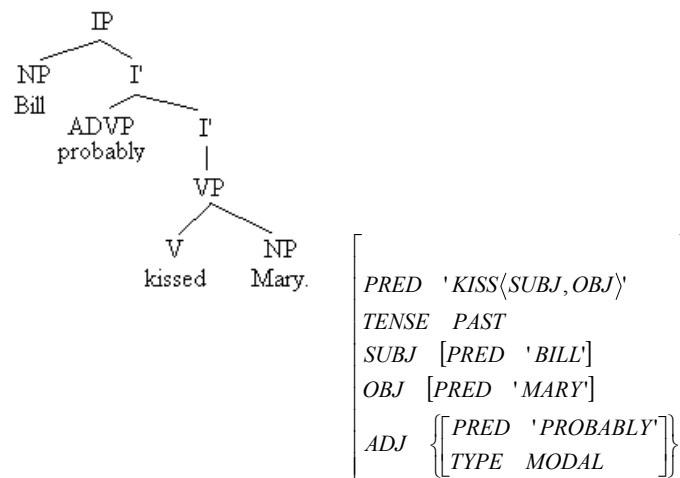
In her PhD thesis, Engels (2004) points out the different interactions of adverbs with auxiliaries and main verbs. She observes that a ‘sentence adverb’, those our grammar adjoins to I’, must precede a finite main verb.

- (69) a. Bill (probably/wisely) kissed Mary.
b. Bill kissed (*probably/*wisely) Mary.
(Engels 2004, 10)

The above formulated PS rules have all incorporated aspectual auxiliaries, but can also accommodate sentences with only a main verb by allowing I’ to remain a category with no overt head, dominating VP, with the ADVP adjoined either to the empty I’ or to the

VP, as necessitated by type. Manner will adjoin to VP, while all other types will adjoin to I'.

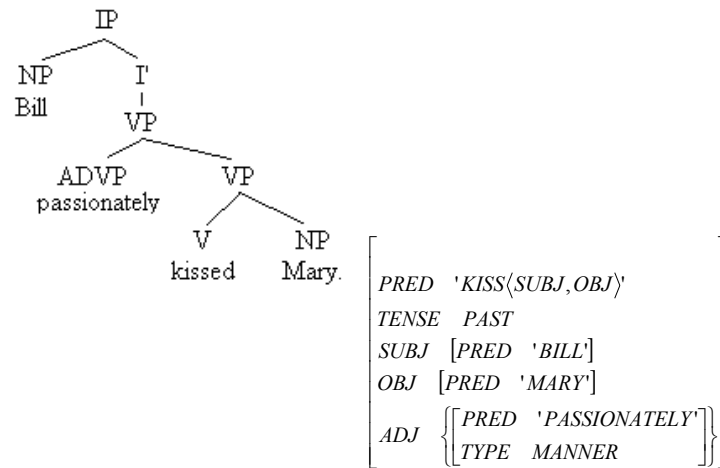
(70) a. Bill probably kissed Mary.

$$I' \rightarrow \begin{array}{c} \text{ADVP} \\ \downarrow \varepsilon (\uparrow \text{ADJ}) \\ (\downarrow \text{TYPE}) \varepsilon \{ \text{EVAL}, \\ \text{SUBJ-O}, \\ \text{MODAL}, \\ \text{EVIDENT} \} \end{array} \quad I'$$


b. Bill passionately kissed Mary.¹¹

$$VP \rightarrow \begin{array}{c} \text{ADVP*} \\ \downarrow \varepsilon (\uparrow \text{ADJ}) \\ (\downarrow \text{TYPE}) = \text{MANNER} \end{array} \quad VP \quad \begin{array}{c} \text{ADVP*} \\ \downarrow \varepsilon (\uparrow \text{ADJ}) \\ (\downarrow \text{TYPE}) = \text{MANNER} \end{array}$$

¹¹ Because we take 'wisely' in (50a) to be subject-oriented rather than manner, and thereby unable to adjoin to VP, we have changed the adverb to the clearly manner-type 'passionately' for the sake of the example.



5.1.2 Auxiliary Interactions

In addition to the restricted patterns of occurrence licensed by the above rules, many adverbial constructions are further restricted by interactions between multiple adverbs occurring in the same sentence and between an adverb and the type of auxiliary, if any, with which it occurs.

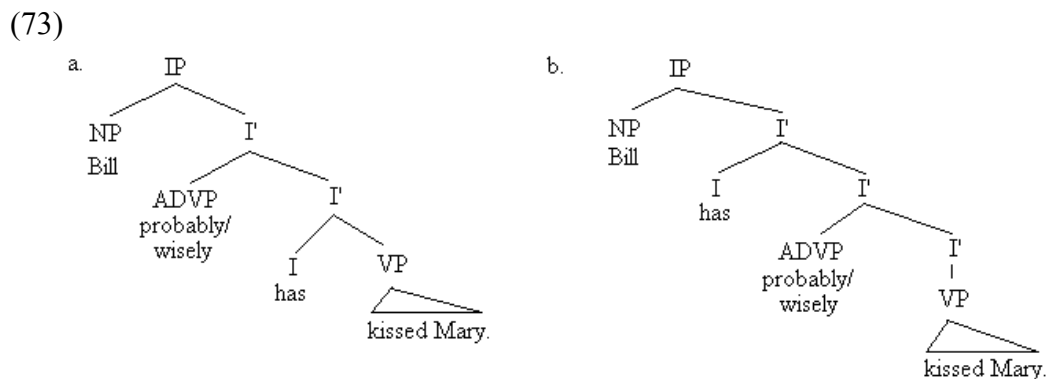
Both Jackendoff (1972) and Engels (2004) observe a number of interactions between specific types of auxiliaries and adverbs and between multiple auxiliaries and adverbs. Jackendoff observes three restrictions on adverb placement with respect to auxiliaries, as demonstrated in (48-50) above, and restated here:

- (71) a. only I' attachment before modal, aspect or emphatic 'do'
 b. either I' or VP attachment between two auxiliaries
 c. only VP attachment following multiple auxiliaries

Engels agrees with Jackendoff's analysis of aspectual aux, but treats modal aux separately, offering a more refined and accurate analysis. Her arguments are not phrased in terms of nodes of attachment, but rather consider linear order.

She states that what she calls a ‘sentence adverb’, but would be under our typology evaluative, modal, evidential, or subject-oriented adverbs, or, more simply, all adjoining to I’, must precede a finite main verb, as we have already seen, but can either precede or follow a finite aspectual auxiliary. In terms of nodes of attachment, this coincides with Jackendoff as immediately pre-verbal adverbs can adjoin to either I’ or VP, while those immediately pre-aspectual aux must adjoin to I’, and those between aspectual aux and the main verb can adjoin to either I’ or VP.

- (72) a. Bill (probably/wisely) has kissed Mary.
 b. Bill has (probably/wisely) kissed Mary.
 (Engels 2004, 10)

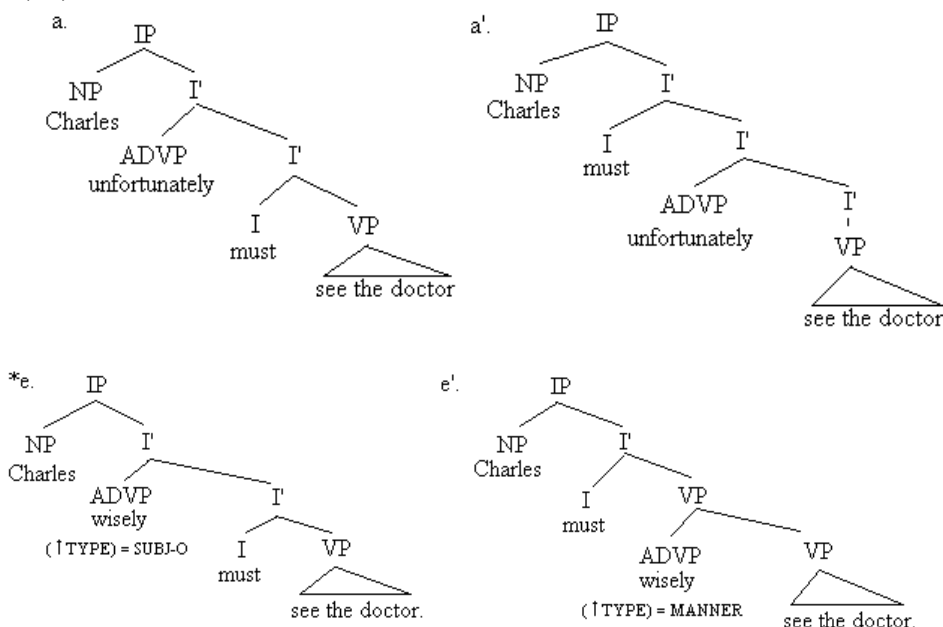


Regarding modals, Engels points out, going beyond Jackendoff, that though nearly all adverbs that can acceptably precede a modal auxiliary can also follow that same modal auxiliary, the reverse is not the case. Not all adverbs that can follow a modal aux can precede it.

- (74) a. Charles (unfortunately) must (unfortunately) see the doctor.
 b. Sue (unfortunately) must (unfortunately) have hit the dog.
 c. Charles (frequently) must (frequently) see the doctor.
 d. Sue (*frequently) must (frequently) have hit the dog.
 e. Charles (*wisely) must (wisely) see the doctor.
 f. Sue (*wisely) must (wisely) have hit the dog.
 (Engels 2004, 10)

Engels points out that while an evaluative can take either position as in (74a-b; 75a,a'), a subject-oriented adverb must follow the modal aux (74e-f; 75e,e').

(76)



We argue that in fact the adverbs in (74e-f) are only subject-oriented in their pre-aux positions, but express their manner type in post-aux positions. Still, our grammar currently allows for subject-oriented type adverbs in all pre-auxiliary I' adjunctions, though Engels is correct in her observation that they cannot occur in pre-modal auxiliary position. Clearly, we must refine our grammar to express this restriction.

Engels also demonstrates that 'a modal verb following a frequency adverb may only receive a deontic reading; if the modal is to be interpreted as epistemic... it has to precede the adverb' (Engels 2004, 10). In (74c), when *frequently* precedes *must*, it is frequent that Charles is compelled to see the doctor. When 'frequently' follows 'must', it is possible that Charles sees the doctor frequently. The subtle difference is more obvious in context.

- (76) a. Charles frequently must see the doctor. He is always ill.
 b. Charles' doctor bill is very high. He must frequently see the doctor.

While this contrast is indeed interesting, we hold that the different readings induced in auxiliary verbs by the presence or absence and placement of various types of adverbs is a semantic matter and need not be treated by the syntax.

We shall address the restrictions argued for by Jackendoff and Engels and their expression in our grammar one at a time, but first we shall discuss the restrictions arising out of the interactions between multiple adverbs occurring in the same sentence, as both kinds of problem can be solved by the same syntactic machinery.

5.1.3 Multiple Adverb Interactions

It has often been pointed out in the literature and much analytic work has been done into the fact that predicational adverbs often exhibit strict ordering with respect to one another.

As alluded to above, Ernst's hierarchy of readings yields the following linear order:

- (77) discourse-oriented > evaluative > modal > evidential >
 subject-oriented > manner¹²
 (Ernst 2002, 45, his (2.13))

- (78) a. Jim luckily has wisely refused the offer.
 a'. *Jim wisely has luckily refused the offer.
 b. Gina probably has tactfully suggested that we leave.
 b'. *Gina tactfully has probably suggested that we leave.
 c. Honestly, they surely will drive us out of this house!
 c'. *Surely, they honestly will drive us out of this house!

(Adapted from Ernst 2002, 127, his (3.110-3.112))

¹² We have omitted occurrence of negatives, as this paper does not deal with negation. Ernst allows negatives to occur optionally between modal and evidential, or between subj-o and manner. For examples and discussion, see Ernst 2002, 45, 127.

According to Ernst's theory, these restrictions arise out of the necessity for certain adverbs to take certain kinds of event-arguments and to yield certain kinds of event-arguments after combining with their arguments. *Probably* requires a proposition and yields a fact, while 'tactfully' requires an event and yields a proposition, therefore *tactfully* cannot precede *probably*, while *probably* can precede *tactfully* (Ernst 2002, 127-128).

When comparing Ernst's hierarchy to our grammar, we find that a large number of his restrictions fall out naturally from the grammar. For instance, the linear precedence of modal adverbs over manner adverb occurrences need not be explicitly stated in our grammar as the rule which licenses modal adverbs only allows attachment of modals to I', while manner adverbs can attach only to VP, which must necessarily occur below or to the right of I', meaning that modals will always occur before manner adverbs. Because we have used the same idea for dividing adverbs as Ernst did in his hierarchy, and have attached those adverb types to specific nodes in the tree, many of his restrictions occur naturally in our grammar. The ordering restrictions already expressed by our grammar are as follows:

- (79) Discourse-oriented > all other adverbs¹³
modal > manner
evaluative > manner
evidential > manner
subject-oriented > manner
modal > manner

¹³ Because our analysis allows discourse-oriented adverbs to occur only with sentence-initially or elsewhere comma intonation, which makes their inclusion here unnecessary, as we do not discuss this position for reasons given previously. However, the inclusion here remains both because it is information extracted from Ernst (2002) and because it is an important ordering restriction, even if not further explicated here. We would further like to note that such a restriction is easily expressible if the analyses from Cobb (2006) and the present paper are combined to provide a fuller picture of adverbial syntax.

Following Ernst's hierarchy, our grammar must be expanded to express the following restrictions (given as individual precedence equations for simplicity):

- (80) Evaluative > modal
- Evaluative > evidential
- Evaluative > subject-oriented
- Modal > evidential
- Modal > subject-oriented
- Evidential > subject-oriented

We propose that such restrictions can be expressed by the inclusion of functional precedence rules in the lexical entries of adverbs of the relevant types.

After first discussing the notion of functional precedence and outlining how it will aid in expressing the above restrictions, we will explore each precedence restriction individually, evaluate its validity and describe the appropriate rule to be inserted in to the lexicon.

5.2 Functional Precedence

Functional precedence (f-precedence) was originally devised and is mainly used to account for cases in which pronominals linearly precede their antecedents, but can be used to explain situations in which an f-structure is related to a discontinuous c-structure or when an f-structure does not correspond to any c-structure node, among others. The adverbial ordering restrictions we are dealing with do not strictly fall into either of these two roles, as the adverbs are neither discontinuous from their constituents, nor lack a corresponding c-structure node, though they do appear within a discontinuous verb phrase. Rather, the applicability of f-precedence to adverbial ordering restrictions is

much simpler, demonstrating perhaps the most basic purpose of the idea: to regulate linear order with functional information.

F-precedence expresses the relationship between two f-structures based on the c-structure precedence, and in this case linear precedence, relationship existing between the two relevant nodes. Following Dalrymple (2001), we use the definition of f-precedence formulated by Kaplan and Zaenen (1989):

- (81) F-precedence:
 f f-precedes g ($f <_f g$) if and only if for all $n_1 \in \varphi^{-1}(f)$ and for all $n_2 \in \varphi^{-1}(g)$,
 n_1 c-precedes n_2 .
(Kaplan and Zaenen 1989, quoted in
Dalrymple 2001)

This definition states that an f-structure f f-precedes an f-structure g if and only if all of the nodes corresponding to f in the c-structure come before and do not dominate all of the nodes corresponding to g in the c-structure. Or, more plainly, that the f-structure for a node that linearly precedes some other node, will come before the f-structure associated with that other node.

In terms of adverbial distribution and f-structures, this means that we can attach an f-precedence rule to each adverb's lexical entry specifying which adverbs it can and cannot precede in a sentence to eliminate unacceptable constructions allowed by our grammar as yet.

Currently, the grammar set forth would allow sentences such as:

- (82) a. (*)Ross has probably surprisingly hidden the biscuits.¹⁴
b. (*)Ross stupidly has probably hidden the biscuits.

Though each of these is technically allowed by the grammar devised above, neither is acceptable. The grammar must be extended to restrict multiple adverbs in a sentence to certain orders of occurrence.

In keeping with our heavy reliance on f-structure, we argue that restrictions on adverb and auxiliary co-occurrence of the type observed by Jackendoff and Engels, as well as ordering restrictions on multiple occurrence of adverbs in a single sentence can be expressed by f-precedence rules, which we propose are included in the lexical entry for each adverb. We will begin with auxiliary interactions and then proceed to multiple adverb occurrence.

5.3 F-Precedence Resolution of Auxiliary Interactions

To review, the restrictions Jackendoff observes, given in (71) above, are as follows:

- (83) a. only I' attachment before modal, aspect or emphatic 'do'
b. either I' or VP attachment between two auxiliaries
c. only VP attachment following multiple auxiliaries

To these, Engels further adds the observation that subject-oriented adverbs cannot precede a modal auxiliary.

- (84) a. (*)Charles wisely must see the doctor.
b. Charles must wisely see the doctor.

¹⁴ Here and henceforth, the (*) notation will be used to denote sentences allowed by the grammar in its current state but which must be ruled out by further revisions.

We will address Jackendoff's restrictions on multiple auxiliaries first, as Engels' analysis makes his first restriction regarding modals, aspectuals and emphatics a more complicated issue. Addressing these two issues will constitute a short digression from the use of f-precedence, to which we shall return in resolving the issue of adjunction before a modal auxiliary.

5.3.1 Attachment Between Two Auxiliaries

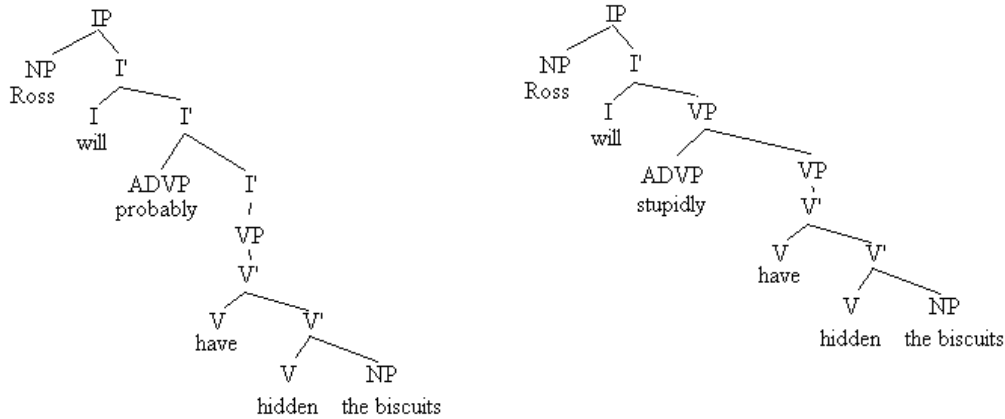
Though I' adjunction is preferred in cases in which an adverb appears between two auxiliaries, it is possible to find cases in which VP adjunction is plausible, even necessary. For example, the following example is ambiguous between the subject-oriented and manner functions.

- (85) Otherwise we will stupidly have dropped the victory won in Africa, in Italy, in Germany and in Japan.¹⁵

It is unclear, even in context, whether 'we' are stupid for having dropped the victory at all, or whether the way in which the victory was dropped was stupid. Though the I' adjunction construction is more likely and common in such sentences, we must allow for VP adjunction as well, which is, ironically, the more elegant-looking construction of the two.

¹⁵ Third World Traveller website. Excerpts from George Seldes' *Victory over Fascism* (New York 1943). www.thirdworldtraveller.com/George_Seldes/Seldes_Fascism.html. Accessed 21 March 2006.

(86) I' or VP attachment between two auxiliaries

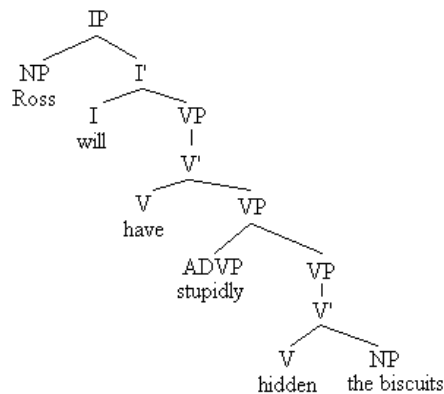


These two constructions, in which *probably* functions as a modal, and *stupidly* as an evaluative, again falls out from the annotated rules already given, which allow evaluative, subject-oriented, modal and evidential adverbs to adjoin to I' below the tensed aux and above the aspectual aux occurring in V, and adjoin manner adverbs to the left of VP, again, below the tensed aux but above the aspectual aux in V.

5.3.2 Attachment Following Multiple Auxiliaries

This again falls out naturally from our grammar, though it does necessitate the slight modification of the PS rule licensing VP adverbial adjunction to include adjunction to V'. Because all auxiliaries barring the first must occur in V, any adverb occurring following a secondary (or tertiary, etc) auxiliary verb must adjoin to V' within the VP.

(87) V' attachment following multiple auxiliaries

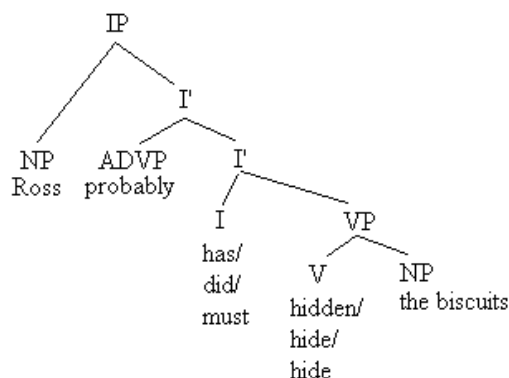


This construction does not necessitate any additional PS rules, but is simply generated using VP adjunction as given in rule (66).

5.3.3. Attachment Before a Modal, Aspectual or Emphatic *Do*

The restriction to I' adjunction before a modal, aspectual or emphatic *do* falls out from the I' adjunction rule as already given. Jackendoff states that 'only S adverbs' are allowed before aspect, a modal, or emphatic *do* (Jackendoff 1972, 75). Extrapolating from Jackendoff's classification of adverbs into speaker-oriented, subject-oriented, and manner and the positions he allows for each, it is quite acceptable to state in our terms that Jackendoff prohibits adverbs functioning as 'manner' type adverbs in the pre-modal, aspect or emphatic *do* auxiliary position. As seen in the annotated PS rule given in (67), which prohibits the expression of the manner type when adjoined to I', this is easily expressed by our theory.

- (88) I' attachment before modal, aspect or emphatic *do*
- a. Ross probably has hidden the biscuits. (aspectual)
 - b. Ross probably did hide the biscuits. (emphatic)
 - c. Ross probably must hide the biscuits. (modal)
 - d. *Ross wisely must hide the biscuits. (with manner interpretation)



The LFG framework as currently proposed allows expression of this restriction through inclusion of f-precedence rules in the lexical entries of subject-oriented adverbs. For instance, the lexical entry for *wisely*, would look something like the following:

$$\begin{array}{llll}
 (89) & \text{wisely} & \text{ADV} & (\uparrow\text{PRED}) = \text{'WISELY'} \\
 & & & (\uparrow\text{TYPE}) \in \{\text{SUBJ-O,} \\
 & & & \quad \text{MANNER}\} \\
 & & & -[f \uparrow < \left(\begin{array}{cc} & \text{ADJ} \\ & \varepsilon \uparrow \end{array} \right)] \\
 & & & \quad (\leftarrow \text{TYPE}) = \text{MODAL}
 \end{array}$$

In the f-precedence expression, we have also made use of inside-out functional uncertainty, a principle used to define constraints on an enclosing structure. In this case, the f-precedence expression prohibits the following situation from obtaining: an f-structure with the above element in its adjunct set, having the attribute TYPE with the value MODAL f-precedes what is above. It is the lowest line which constitutes the inside-out functional uncertainty by stating that the adjunct set referred to in the upper line must be embedded within a structure containing the attribute value pair (TYPE, MODAL), where the left arrow designates the f-structure in which the ADJ set is embedded. Therefore, if an adverb with type SUBJ-O appears in a sentence's adjunct set, no auxiliary of type MODAL may precede that adverb. Though the modal and the main verb will correspond to the same f-structure, this does not rule out cases in which the

adverb appears between a modal and the main verb because a segment of the f-structure corresponding to the verb, the modal segment, will correctly f-precede the f-structure corresponding to the adverb. Because the lexical entry in our example allows the adverb to exhibit either SUBJ-O or MANNER as its TYPE, this expression will prevent manner adverbs from preceding modal auxiliaries as well. As our phrase structure rules already prevent the occurrence of manner adverbs to the left of a primary or single auxiliary, expression of the manner restriction here is a bit redundant, though necessary for the subject-oriented type, and does not prohibit any correct grammatical structure. Of course, this entire analysis of adverb-auxiliary interaction assumes a listing in the auxiliary verb's lexical entry specifying its TYPE as MODAL.

(90) must AUX (\uparrow TYPE) = MODAL¹⁶

Such an assumption is not wholly unfounded. Falk (2001) proposes lexical entries for auxiliaries capable of beginning questions to have a 'type' specification designating their ability to serve as a question marker when appearing in the C node.

(91) might I/C (\uparrow TENSE) = MIGHT
 $C \Rightarrow (\uparrow TYPE) = Q$
 (Falk 2001, 216)¹⁷

Falk's proposed lexical entry is more complicated than that we propose, but the idea is the same. Inclusion of a type designation in the lexical entry for auxiliary verbs, when combined with f-precedence rules in the lexical entries of subject-oriented adverbs, allows expression of ordering restrictions affecting adverb placement and requires no additional machinery, as f-precedence rules very similar to that proposed will also be seen

¹⁶ While our proposed lexical entry is undoubtedly incomplete, the features of importance here are those shown.

¹⁷ In his lexical entries, Falk uses node of attachment where we have specified grammatical category. The differences between the two are inconsequential here.

to be necessary for expression of ordering restrictions on occurrence of multiple adverbs in a single sentence and are, furthermore, necessitated elsewhere in the grammar as mentioned briefly above.

5.4 Evaluating Ordering Restrictions

Having introduced the principle of f-precedence and demonstrating its capacity for regulating the occurrence of certain adverbial types when combined with certain auxiliary verb types, we will now move on to ordering restrictions that apply when multiple adverbs occur in a single sentence and demonstrate the ability of f-precedence rules to govern their interactions.

5.4.1 Eval > Modal

The current rules governing evaluatives and modals allow both to occur pre- or post-auxiliary, with evaluatives also being allowed to occur following the main verb.

$$(92) \quad I' \rightarrow \begin{array}{c} \text{ADVP} \\ \downarrow \varepsilon (\uparrow \text{ADJ}) \\ (\downarrow \text{TYPE}) \varepsilon \{ \text{EVAL}, \\ \text{SUBJ-O}, \\ \text{MODAL}, \\ \text{EVIDENT} \} \end{array} \quad I'$$

- (93)
- a. Ross has surprisingly probably hidden the biscuits.
 - b. Ross surprisingly probably has hidden the biscuits.
 - c. Ross surprisingly has probably hidden the biscuits.
 - d. (*)Probably, Ross has surprisingly hidden the biscuits.
 - e. (*)Probably, Ross surprisingly has hidden the biscuits.
 - f. (*)Ross probably has surprisingly hidden the biscuits.
 - g. (*)Ross has probably surprisingly hidden the biscuits.
 - h. (*)Ross probably surprisingly has hidden the biscuits.

Though expression using f-precedence rules does not allow reference to specific nodes by name, the rule, when applied in conjunction with the phrase structure rules already devised, must constrain modals to adjunction to VP when the evaluative adjoins to I', or

to a subsequent I' when the evaluative also adjoins to I', preceding I (left I' adjunction, where 'left' refers to the orientation relative to the I node).

A sample lexical entry for *surprisingly* is given below. The same f-precedence expression would occur in the lexical entry for each evaluative adverb.

$$(94) \quad \text{Surprisingly} \quad \text{adv} \quad \begin{array}{l} (\uparrow\text{PRED}) = \text{'SURPRISINGLY'} \\ (\uparrow\text{TYPE}) = \text{EVAL} \\ \neg [((\varepsilon \uparrow) \varepsilon) < f \uparrow] \\ (\rightarrow \text{TYPE}) = \text{MODAL} \end{array}$$

The f-precedence expression, similar to that given above for auxiliaries, reads: it is not the case that an element of the set of which the above element is a member can occur before the element denoted above if that other element is of the type MODAL. Because all adverbs will occur within the ADJ set of a sentence, and because we have used the TYPE attribute and the MODAL value for both adverbs and auxiliaries, when ruling out certain types of adverbs on the basis of the presence of other types of adverbs, we must refer only to elements occurring within the adjunct set. Therefore, if an adverb with type EVAL appears in a sentence's adjunct set, no adverb of type MODAL may precede that adverb, though other elements of type MODAL, such as auxiliaries, can occur. This correctly rules out sentences (93d-h) above. Such restrictions on relative ordering are extremely difficult, if not impossible, to express using phrase structure rules alone, but are very simply expressed using functional annotation as the f-structure provides an overall view of the sentence unavailable to phrase structure rules.

5.4.2 Eval > Evidential

Sentences allowed by the current grammar are as follows, with both evaluative and evidential adverbs allowed to attach to I':

- (95) a. Ross unexpectedly has clearly hidden the biscuits.
 b. Ross unexpectedly clearly has hidden the biscuits.
 c. Ross has unexpectedly clearly hidden the biscuits.
 d. (*)Clearly, Ross unexpectedly has hidden the biscuits.
 e. (*)Ross clearly has unexpectedly hidden the biscuits.
 f. (*)Ross clearly unexpectedly has hidden the biscuits.
 g. (*)Ross has clearly unexpectedly hidden the biscuits.

We must restrict occurrences of evidentials to a second instance of I' when an evaluative appears in a first I' to the left of I.¹⁸

- (96) Unexpectedly adv (↑PRED) = 'UNEXPECTEDLY'
 (↑TYPE) = EVAL

$$-\left[\left(\left(\varepsilon \uparrow \right) \varepsilon \right) < f \uparrow \right]$$

 (→TYPE) = EVIDENT

The notation is the same as above, except that instead of singling out MODAL adverbs, this rule states that adverbs with type EVIDENT cannot occur before EVAL.

5.4.3 Eval > Subj-O

We have already seen that EVAL can occur in I' or VP. SUBJ-O can occur only in I', and must be restricted to a second I' when EVAL occurs in a first I'. EVAL may not appear in VP when co-occurring with SUBJ-O.

- (97) a. Ross surprisingly has stupidly hidden the biscuits.¹⁹
 b. Ross has surprisingly stupidly hidden the biscuits.
 c. *Ross stupidly has surprisingly hidden the biscuits.
 d. *Ross has stupidly surprisingly hidden the biscuits.
 e. (*)Stupidly, Ross surprisingly has hidden the biscuits.

¹⁸ Many of the sentences given here in which two adverbs occur adjacent to one another seem unacceptable but continue to be licensed by our grammar. We will deal with their questionable grammaticality in a forthcoming section of this paper.

¹⁹ 'Stupidly' in these sentences is used in its subject-oriented type, not as a manner adverb.

$$\begin{aligned}
 (98) \quad \text{surprisingly} \quad \text{adv} \quad & (\uparrow\text{PRED}) = \text{'SURPRISINGLY'} \\
 & (\uparrow\text{TYPE}) = \text{EVAL} \\
 & \neg [((\varepsilon \uparrow) \varepsilon) < f \uparrow] \\
 & (\rightarrow \text{TYPE}) = \text{SUBJ-O}
 \end{aligned}$$

Again, the rule is formulated such that SUBJ-O cannot precede any adverb of type EVAL.

The three rules given above all limit the precedence of EVAL over some other type of adverb. To maintain the simplest grammar possible, the rules can be combined in a way similar to the set notation used in lexical entries, stating that it is not the case that an adverb of the set of which the adverb denoted above is also a member may occur before the adverb denoted above, if that other adverb's type is a member of the set containing MODAL, EVIDENT, or SUBJ-O.

(99) Condensed Eval precedence rule:

$$\begin{aligned}
 \text{Surprisingly} \quad \text{adv} \quad & (\uparrow\text{PRED}) = \text{'SURPRISINGLY'} \\
 & (\uparrow\text{TYPE}) = \text{EVAL} \\
 & \neg [((\varepsilon \uparrow) \varepsilon) < f \uparrow] \\
 & (\rightarrow \text{TYPE}) \varepsilon \{ \text{MODAL}, \\
 & \quad \text{EVIDENT}, \\
 & \quad \text{SUBJ-O} \}
 \end{aligned}$$

5.4.4 Modal > Evidential

Both modals and evidentials are allowed to adjoin to I'. As with evaluatives and subject-oriented adverbs above, we must restrict evidentials to a secondary I' when a modal adjoins to a primary I' to the left of I.

(104) Condensed Modal Precedence Rule:

$$\begin{array}{l}
 \text{Probably} \quad \text{adv} \quad (\uparrow\text{PRED}) = \text{'PROBABLY'} \\
 (\uparrow\text{TYPE}) = \text{MODAL} \\
 \neg[(\varepsilon \uparrow) \varepsilon \quad \quad \quad] < f \uparrow \\
 (\rightarrow \text{TYPE}) \varepsilon \{ \text{EVIDENT}, \\
 \text{SUBJ-O} \}
 \end{array}$$

5.4.6 Evidential > Subj-O

Precedence of evidentials over subject-oriented adverbs is the final co-occurrence

restriction we must formulate. As both types can occur adjoined to I', SUBJ-O, must be restricted to a secondary I' to the right of I when EVIDENT adjoins to primary I' to the left of I.

- (105) a. Obviously, Ross stupidly has hidden the biscuits.
 b. Ross obviously has stupidly hidden the biscuits.
 c. Ross has obviously stupidly hidden the biscuits.
 d. (*)Stupidly, Ross obviously has hidden the biscuits.
 e. (*)Ross stupidly has obviously hidden the biscuits.

$$\begin{array}{l}
 (106) \text{ Obviously} \quad \text{adv} \quad (\uparrow\text{PRED}) = \text{'OBVIOUSLY'} \\
 (\uparrow\text{TYPE}) = \text{EVIDENT} \\
 \neg[(\varepsilon \uparrow) \varepsilon \quad \quad \quad] < f \uparrow \\
 (\rightarrow \text{TYPE}) = \text{SUBJ-O}
 \end{array}$$

As with the other rules, this equation rules out the occurrence of SUBJ-O type adverbs before 'obviously' when they occur in the same adjunct set.

To summarize, in order to express the necessary ordering restrictions observed to hold between co-occurring adverbs of different types, the lexical entries of adverbs must be expanded to contain f-precedence rules dictating the precedence of certain adverb types over other adverb types. A number of the restrictions observed by Ernst (2002) and others fall out from our grammar naturally and do not necessitate the use of f-precedence. Though we could, for the sake of uniformity, propose that f-precedence rules govern all

ordering restrictions, even those that occur naturally in our grammar, we will avoid redundancy and argue that only those restrictions not expressed elsewhere are contained in the f-precedence equations within the lexical entries of all adverbs of a given type.

The three f-precedence rules we propose are as follows:

(107) a. Condensed Evaluative Precedence Rule:

surprisingly adv (\uparrow PRED) = 'SURPRISINGLY'
 (\uparrow TYPE) = EVAL
 $\neg[\left[\left(\left(\varepsilon \uparrow \right) \varepsilon \right) < f \uparrow \right]$
 $(\rightarrow \text{TYPE}) \varepsilon \{ \text{MODAL},$
EVIDENT
SUBJ-O }

b. Condensed Modal Precedence Rule:

probably adv (\uparrow PRED) = 'PROBABLY'
 (\uparrow TYPE) = MODAL
 $\neg[\left[\left(\left(\varepsilon \uparrow \right) \varepsilon \right) < f \uparrow \right]$
 $(\rightarrow \text{TYPE}) \varepsilon \{ \text{EVIDENT},$
SUBJ-O }

c. Evidential Precedence Rule:

obviously adv (\uparrow PRED) = 'OBVIOUSLY'
 (\uparrow TYPE) = EVIDENT
 $\neg[\left[\left(\left(\varepsilon \uparrow \right) \varepsilon \right) < f \uparrow \right]$
 $(\rightarrow \text{TYPE}) = \text{SUBJ-O}$

The specific adverbs here are only samples of their type. The f-precedence rule for each adverb of a given type will be the same. While we cannot think of any adverb that shares two (or all) of the three types EVAL, MODAL and EVIDENT, we propose that should any adverb exist, the f-precedence rules for each type would appear in the lexical entry

and apply simultaneously as to allow occurrence of multiple adverbs in only the appropriate order.

Having settled the issue of what adverbial ordering restrictions exist in the grammar and how they are formalized, we must now address cases of adverbial adjacency, where the grammar allows side-by-side occurrence of two (or more) adverbials.

5.5 Adverbial Adjacency

It is often observed in the literature that cases of adverbial adjacency render sentences rather odd-sounding, if not wholly uninterpretable. Before pursuing an analysis of adverbial adjacency under our theory, we must first come to a conclusion regarding interpretability.

The following sentences featuring adverbial adjacency were all found in the public domain:

- (108) a. *Obviously, clearly*, Percursio is on indefinite, extended hiatus.²⁰
b. Even frivolous – and, frankly, clearly absurd – practices may lead to wrangling over IP rights.²¹
c. In the silence and still air sound carries *surprisingly clearly*.²²
d. As we suspected, the only elephant who firmly refused to be coaxed inside was Mpala, for he *obviously clearly* remembered, with bad connotations, another journey in a vehicle when he travelled to Nairobi from far off Mpala Ranch in Laikipia vehicle.²³
e. You can *probably clearly* see the screen and your hand.²⁴

²⁰ Percursio website. www.percursio.com. Accessed 14 March 2006.

²¹ CRM Buyer website. The Intellectual Property Pitfalls of Enterprise IT. Erika Morphy. www.crmbuyer.com/story/49258.html. Accessed 14 March 2006.

²² Travel Intelligence: Ballooning in Portugal by James Henderson website. James Henderson. www.travelintelligence.net/wsd/articles/art_2526.html. Accessed 14 March 2006.

²³ The David Sheldrick Wildlife Trust: On-line Updates website. www.sheldrickwildlifetrust.org/updates/updates.asp?Rhino=&ID=11. Accessed 14 March 2006.

²⁴ Urbanfox website. Contrast Range by Christian Fox. Christina Fox. www.urbanfox.tv/workbooks/anycam/contrast.htm. Accessed 14 March 2006.

Sentences (108a) and (108b) both exhibit what we have elsewhere referred to as ‘disjunct’ adverbials on the basis of their incomplete syntactic integration into the host sentence as shown by their occurrence in comma intonation, (108c) shows an adverb modifying another adverb, and (108d) and (108e) demonstrate the occurrence of two functionally different adverbials in linearly adjacent positions. It is these cases which are most interesting for theories of adverbial syntax, though we argue that all of the above cases are indeed both syntactically permissible and fully interpretable.

5.5.1 Disjunct Adverbials

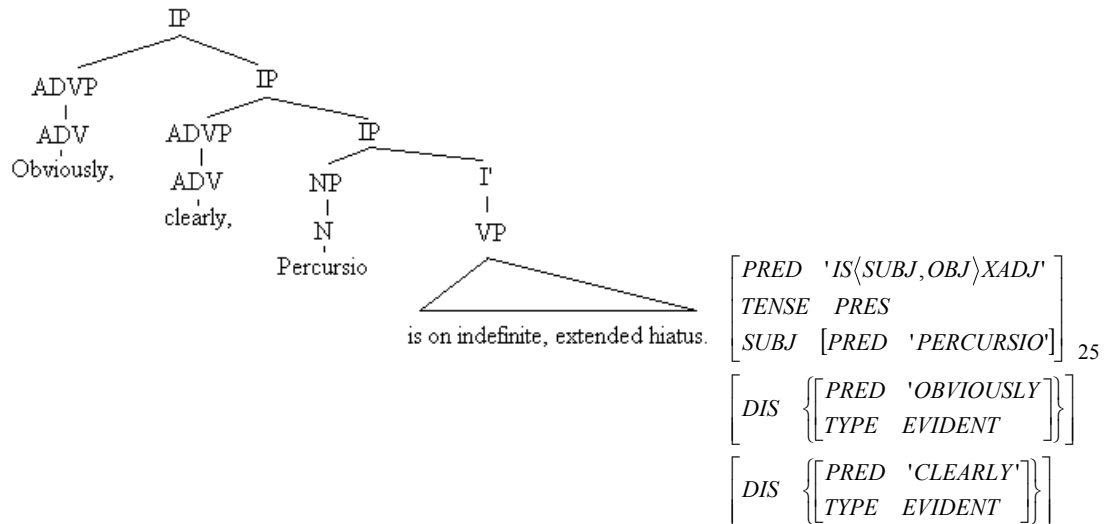
The disjunct cases in (108a) and (108b) have been thus far omitted from this study as they constitute a principled exception to the functional annotations and PS rules here set forth. Their treatment is somewhat complicated, as their c-structure occurrence appears as an adjunction structure, despite their failure to behave syntactically as such. Both to illustrate this odd syntactic behaviour and to allow multiple occurrences in a single sentence, however, their f-structure appearance is separated out of the main sentence f-structure – hence ‘disjunct’. They are functionally and syntactically ‘disjoined’ from their host sentences

Because adverbs appear as members of the adjunct set of a sentence, theoretically, multiple adverbs of the same type can occur in the same sentence. However, while such constructions do not sound wrong, necessarily, they certainly do sound odd.

- (109) a. Ross has quickly hidden the biscuits wisely.
b. Ross probably has obviously hidden the biscuits.
(*obviously* with modal interpretation)

A sentence with two subject-oriented, two modal, or two of any type of adverb is somewhat off-sounding. We argue that this occurrence is a result of a semantic clash between the two adverbs and does not arise out of any syntactic process. However, because, as we argue elsewhere, disjunct adverbials are not members of the same f-structure as the sentence itself, the problem of two adverbs occurring in a single f-structure is eliminated. The disjunct adverbials will map to their own individual f-structures. Thus, sentence (108a) would have a structure something like the following:

(110) Obviously, clearly, Percursio is on indefinite, extended hiatus.



Both *obviously* and *clearly* as used in (108a) are evidential adverbs as both remark on the evidentiality of the fact that Percursio is on hiatus. Because they appear in separate f-structures, their typological identity is not a problem; their PREDs and TYPEs do not clash because the restriction of a single type per f-structure does not apply here, despite the relation of these multiple f-structures to a single c-structure. The structure for (108b), though complicated by the separation signified by the dashes in combination with the

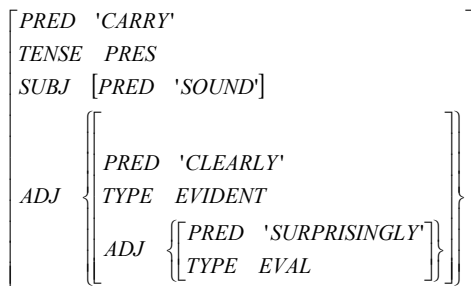
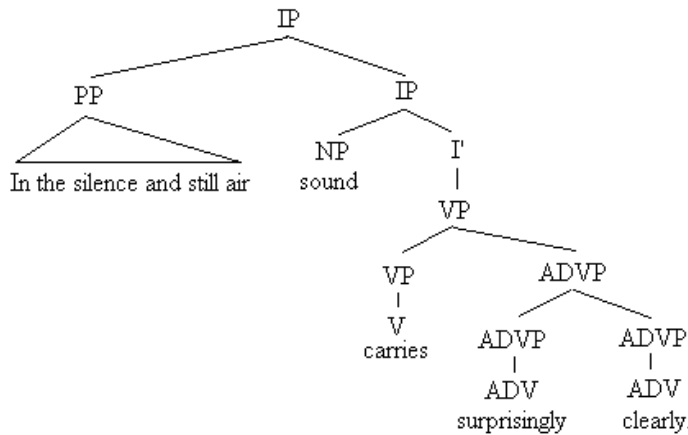
²⁵ The XADJ that should appear in the f-structure here to represent the phrase ‘on indefinite, extended leave’ has been omitted for sake of notational simplicity, as it is not the main focus of our argument.

comma intonation around ‘frankly’, would be similar, with at least one adverb represented as a disjunct in a separate f-structure.

5.5.2 Adverbs Modifying Adverbs

Sentence (108c), repeated here as (111) with c- and f-structures, is a somewhat simpler case of one adverb modifying another adverb.

(111) In the silence and still air sound carries surprisingly clearly.



Because the two adverbs are not of the same type, they can both easily appear in the same f-structure. However, as *surprisingly* modifies *clearly*, rather than both modifying the verb, *surprisingly* is not simply a member of the set of adjuncts modifying the verb, but rather an adjunct within the adjunct set modifying the verb, as shown in the above f-structure which displays the ADJ for *surprisingly* embedded within the ADJ for *clearly*. The same embedding structure can be used for adjective/adverb and other adverb/adverb combinations like *very large* or *obviously hardly*, as in *He obviously hardly noticed the*

mistake, whether they be cases of modification, like the former, or cases of two adverbs of different types, like the latter.

Clearly, not all cases of an adverb modifying another adverb will make sense. For instance, reversing the order of *hardly* and *obviously* in the above sentence renders it nonsensical: **He hardly obviously noticed the mistake*. These types of ordering restrictions are easily governed by the f-precedence rules proposed above. The precedence of evaluatives over evidentials is expressed by the rule in (96), section 5.4.2.

5.5.3 Unmitigated Adverbial Adjacency

As stated in the brief introduction to this section, cases like (108d,e), in which two adjunct adverbials of different types, neither of which modifies the other, appear next to one another in a sentence are the most interesting for theories of adverbial syntax as they make the nearness of adverbial syntax to the syntax-semantics interface very clear. Both adverbs must be accounted for syntactically, regardless of type, and allowed to adjoin to structures such that they modify the same part of the sentence, be it the entire main clause or only the VP, and both must be accounted for in terms of the way in which they affect the interpretation of the sentence – in our grammar, typologically. Because f-structure is a level already hovering near the syntax-semantics interface, these types of occurrence are easily treated under the current grammar.

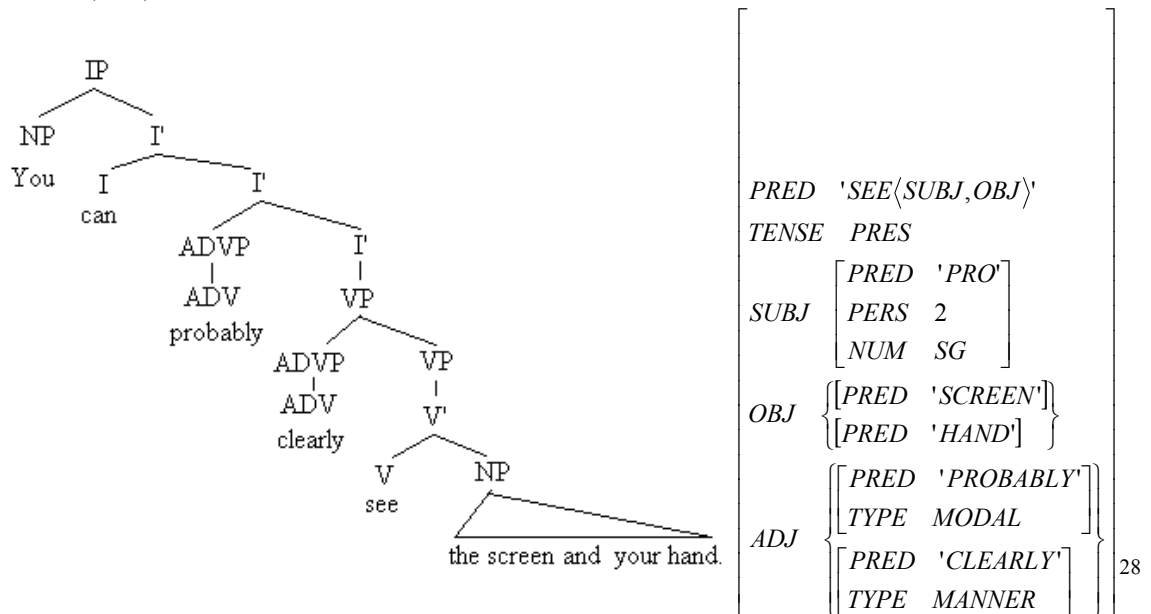
Sentences (108d) and (108e) are repeated here as (112a, b) for simplicity.

- (112) a. As we suspected, the only elephant who firmly refused to be coaxed inside was Mpala, for he *obviously clearly* remembered, with bad connotations, another journey in a vehicle when he travelled to Nairobi from far off Mpala Ranch in Laikipia vehicle.²⁶
- b. You can *probably clearly* see the screen and your hand.²⁷

As in (111), issues of ordering are handled by the ordering restrictions given in section 4.5. What we must address here is the creation of c- and f-structures by the rules laid out above that are capable of incorporating adjacent adverbials.

In fact, the task is not as difficult as it might seem. For instance, in (112b), *probably*, which functions as a modal adverb, will adjoin to I' while *clearly*, which here functions as manner, will adjoin to VP. In the f-structure, both adverbs will appear as members of the ADJ set within the f-structure of the main sentence.

(113)



²⁶ The David Sheldrick Wildlife Trust: On-line Updates website. www.sheldrickwildlifetrust.org/updates/updates.asp?Rhino=&ID=11. Accessed 14 March 2006.

²⁷ Urbanfox website. Contrast Range by Christian Fox. Christina Fox. www.urbanfox.tv/workbooks/anycam/contrast.htm. Accessed 14 March 2006.

As shown by the c-structure, *probably* adjoins to I' and *clearly* adjoins to VP, as accords their typological designations. There is no issue of multiple adjunction to the same node. In the f-structure, both adverbs appear in the ADJ set, with no clash arising from their different types.

Both of the examples given in (112) contain adverbs which can only adjoin to different nodes: *obviously* in (106a) is evidential and *probably* in (112b) is modal and so both must adjoin to I'. In both examples, *clearly* is a manner adverb, describing the way in which Mpala *remembered* in (112a) and the way in which you can *see the screen* in (112b).

Though 'clearly' can be evidential, in these cases we maintain that it is in fact manner and so must adjoin to VP, allowing the structure shown above.

Yet not all cases will work out this way. It may occur that two adverbs occur in linearly adjacent positions and are only permitted by our annotated PS rules to adjoin to the same node, be it I' or VP. For example, consider the following sentences:

- (114) a. The CSP has *unfortunately already* been cut in the appropriations process by more than \$3 billion, yet the reconsolidation package targets it for the deepest cuts...²⁹
- b. Where the trial judge had given the jury the option to recommend probation, and that option was rejected, the appellate court concluded that his unnecessary comment that he had not yet gone against a jury did not negate the discretion he had *already obviously* exercised.³⁰

²⁸ The exact f-structure of the object phrase 'the screen and your hand' is inconsequential here and so is underrepresented in this example.

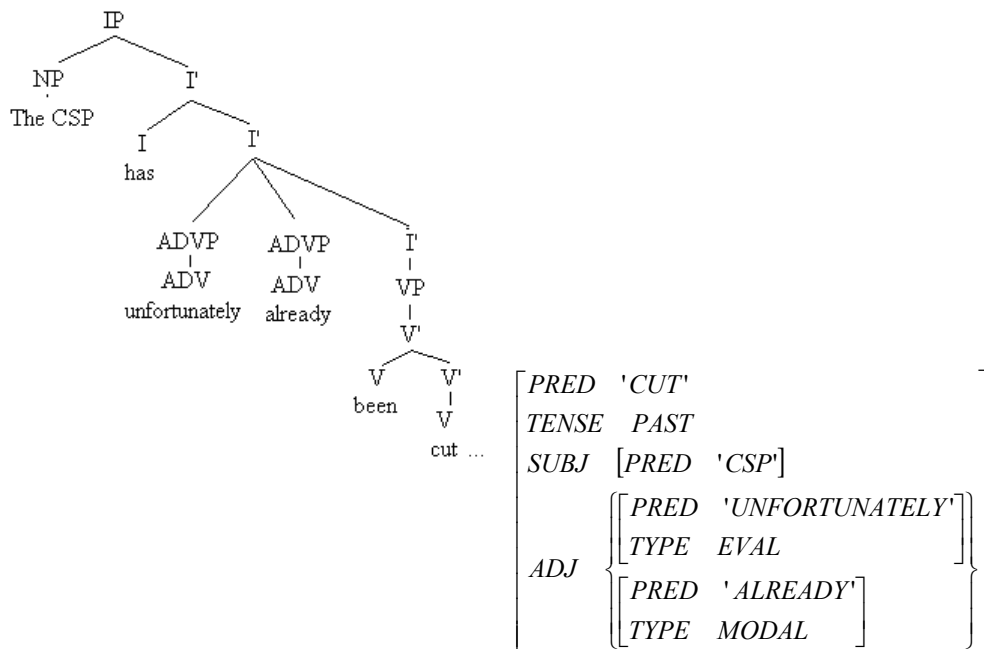
²⁹ Sustainable Agriculture Coalition. Midwest Sustainable Agriculture Working Group. www.msawg.org/pdf/SAC-PressRelease-10-18-05.pdf. Accessed 15 March 2006.

³⁰ Arkansas Judiciary website. Eddie Rodgers v State of Arkansas Decision. <http://courts.state.ar.us/opinions/2001b/20011219/ar01-293.html>. Accessed 15 March 2006.

In (114a), *unfortunately* is an evaluative and *already* is a modal, both of which are only permitted by our grammar to adjoin to I'. In (114b), *already* is again a modal and *obviously* an evidential, and both again adjoin only to I'. Neither construction is ruled out by ordering restrictions, but both do require more complicated c-structures than those given above for single adverbial occurrences.

Because LFG permits tertiary branching, both ADVPs can be adjoined to the same I' node.

(115) The CSP has unfortunately already been cut...



Though the process of adjunction is recursive and would allow adjunction of each ADVP to a separate, successive I' node, such a construction would construe *already* and the VP as one constituent, and *unfortunately already* and the VP as a second, larger constituent. Since *already VP* does not pass any of the tests for constituency without *unfortunately*, we maintain that the two are best represented as sisters adjoined to a single I'. This construction is supported by Bresnan's Economy of Expression principle, which states

that when two trees are possible for the same sentence and same f-structure, the tree with the fewest nodes will be preferred (Bresnan 2001).

It is arguable that *unfortunately* in this case is not a separate adverb modifying the *been cut* as *already* does, but rather that it modifies *already*, as in the adverb-modifying-another-adverb constructions seen above. We maintain that both are in fact legitimate I' adjuncts, modifying the main clause of the sentence, but have already demonstrated the ability of our grammar to capture the alternative interpretation and so will not replicate it here. A similar double adjunction construction can be made for (114b) with *already* and *obviously* adjoining to the same I' node.

5.6 Summary

With only the simple annotated PS rules given in Chapter 4, our grammar can adequately account for a number of relative ordering restrictions arising from multiple adverb occurrence. For those ordering restrictions not naturally expressed by our grammar, we have demonstrated the capability of functional precedence specifications in the lexical entries of subject-oriented adverbs and to evaluative, modal, and evidential adverbs, to adequately restrain multiple occurrences. Functional precedence has also been shown to be useful in constraining the interaction between subject-oriented adverbs and modal auxiliaries. Furthermore, our grammar has been demonstrated to be fully capable of licensing both cases of adverb-adverb modification through the recursive property of adjunction, and cases of unmitigated adverbial adjacency with no additional rules. These small adjustments to the grammar do not require the creation of new principles, but rather rely on rules and properties either already used elsewhere in the grammar in the case of f-

precedence, or simply developed out of rules previously attested to in the grammar outlined here, but have provided necessary and fine-grained refinements to the grammar, thereby increasing its specificity without sacrificing generality.

6.0 Conclusion

We have proposed in this paper a theory of adverbial syntax focussing on the different distributional patterns exhibited by different groups of adverbs. The argument takes advantage of pre-existing principles of LFG and syntax in general: XP and X' adjunction, and the inclusion of functional properties of lexical items in their lexical entries, and exhibited in the f-structure of a sentence, that interact with phrase structure rules to license their occurrence in c-structure. The primary motivator behind the distribution of any given adverb is the typological designation found in its lexical entry, a property that belongs to the adverb and determines, along with the properties of the semantic elements it modifies, its interpretation in the sentence or clause within which it appears. Phrase structure rules are annotated with the typological designations found in adverbs' lexical entries to integrate the relevant f- and c-structures. In general, the theory predicts that a given adverb can appear wherever its typological designation correctly interacts with phrase structure rules.

The main support for this theory is its ability to correctly predict the distribution of a broad range of adverb types. Unlike previous theories that have sub-divided adverbs into categories or classes based on their semantic or distributional properties, we have proposed that the division of adverbs into classes can be conducted on the basis of typological designations that already exist in their lexical entries. The classification 'subject-oriented' is not a label externally applied to a group of similarly behaving adverbs, but rather an internal typological specification that can be exploited to correctly predict distribution. We have demonstrated what lexical entries including these typological designations might look like, and formulated annotated phrase structure rules

that use these typological designations to build an appropriate c-structure. Basic restrictions on distribution arise from a clash between the adverb's type and the phrase structure rules necessary to construct the sentence.

The majority of distributional restrictions across all types of adverbs examined here have fallen out naturally from our grammar. We allow for both manner and clausal interpretations in the immediately pre-verbal position, clausal only to the left and manner only to the right. We have further demonstrated the ability of our grammar to correctly predict, through the addition of f-precedence rules to the lexical entries of certain adverbs, both relative ordering restrictions amongst adverbs and interactions between modal auxiliaries and subject-oriented adverbs.

Additionally, though we have largely omitted discussion of adverbs off-set by comma intonation from the sentences in which they occur, we have indicated briefly the ability of our grammar to cope with such occurrences with only minor adjustments.

This paper in no way purports to provide a comprehensive view of adverbial syntax. In attempting to cover a sufficient range of data, many issues have had to be ignored. Questions remain regarding the cross-linguistic applicability of our analysis as do questions regarding the relation of semantic structure to the f-structures we have proposed. Furthermore, it remains to be seen how our grammar might incorporate non-predicationals such as domain and participant adverbs, as well as adverbial clauses. There is also the possibility of exploring links between typologies and distribution of adverbs and information structure, especially in the case of disjunct adverbials, as they seem somehow connected to notions of topic and focus.

It is entirely possible that exploration of these issues will necessitate large adjustments to the proposed grammar or even provide evidence against its validity, though the evidence discussed here supports our theory. It is our hope that this paper and any work issuing from its ideas, whether it supports the current proposal or forces its reconsideration or even rejection, if need be, will serve as a step toward an accurate representation of adverbial syntax.

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