

## Circumstantial Adverbials and the Theory of Antisymmetry<sup>1</sup>

### 1. Introduction

In a number of languages, sentence-final adverbials of manner, place, and time are allowed to permute without a drastic change in grammaticality or the focus structure of the sentence. In sentences like (1)-(3), it does not seem to matter whether the manner adverbials precede or follow the place adverbials, and whether the place adverbials precede or follow the time adverbials. Instead, all the sentences have equally neutral word order, in the sense that a change in the mutual order of the adverbials does not entail focussing effects:

#### English

- (1) a. I kissed him last night in a garden shed in a most passionate way.
- b. I kissed him in a garden shed last night in a most passionate way.
- c. I kissed him in a garden shed in a most passionate way last night.
- d. I kissed him in a most passionate way in a garden shed last night.

#### Finnish

- (2) a. Sirkku käveli keskiviikkona rannalla ontumalla.  
      'Sirkku walked on Wednesday on the beach with a limp'
- b. Sirkku käveli rannalla keskiviikkona ontumalla.
- c. Sirkku käveli rannalla ontumalla keskiviikkona.
- d. Sirkku käveli ontumalla rannalla keskiviikkona.

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<sup>1</sup> Early versions of this paper were presented at the SKY Symposium *The Relationship between Syntax and Semantics in the Analysis of Linguistic Structure*, University of Helsinki, August 1999, and the LAGB autumn meeting, University of York, September 1999. Thanks to those audiences, as well as to Ronnie Cann, Caroline Heycock, Urpo Nikanne and Roberto Zamparelli for discussion and suggestions, and to the anonymous reviewers for their comments.

**Italian** (data from Cinque 1999)

- (3) a. Seguirò le lezioni tutti i giorni all'università diligentemente.  
'I will attend classes every day at the university with great zeal'
- b. Seguirò le lezioni all'università tutti i giorni diligentemente.
- c. Seguirò le lezioni all'università diligentemente tutti i giorni.
- d. Seguirò le lezioni diligentemente all'università tutti i giorni.

Similar variation is often not possible between arguments of V and adverbials. In sentences like (4)-(6), a change in linear order results either in ungrammaticality or a change in focus structure, in the sense that only one of the sentences has a focus-neutral interpretation while the others are interpreted as involving focussing usually on the sentence-final direct objects. If we use a question/answer test to determine the focus structure of the sentences, we see that they cannot easily serve as answers to the same question (e.g., *What happened?*):

**English**

- (4) a. I kissed a handsome stranger in a garden shed.  
b. I kissed in a garden shed a handsome stranger.

**Finnish**

- (5) a. Sirkku ampui Pulmun rannalla.  
'Sirkku shot Pulmu on the beach'
- b. Sirkku ampui rannalla Pulmun.

**Italian** (data from Zubizarreta 1998)

- (6) a. Maria ha messo il libro sul tavolo  
'Maria has put the book on the table'
- b. Maria ha messo sul tavolo il libro.

Embedded within the Minimalist framework of Chomsky (1995; 1998; 1999) this paper addresses the question of why sentence-final manner, place, and time adverbials (=circumstantial adverbials) are allowed to permute with regard to each other, but not with regard to arguments of V. The paper is

structured as follows: section 2 contains an introduction to the minimalist view on language, and to Kayne's (1994) theory of antisymmetry and Linear Correspondence Axiom (LCA) which states that hierarchical structure determines linear order universally. Section 3 introduces the feature-based theories of adverbials of Alexiadou (1997), Laenzlinger (1998), and Cinque (1999) which put forward the hypothesis that adverbials are licensed in strict one-to-one relations with functional and "light" *v* heads. It also examines the hierarchical relation of circumstantial adverbials to arguments of *V*, and to each other. Section 4 addresses, first, the question of why the sentences in (1)-(3) are problematic for the feature-based theories of adverbials and the LCA. We see that, within such theories, sentences like (1)-(3) can differ in linear order only if they also differ in hierarchical structure so that the same lexical items appear in different structural positions. However, as we also see, such an analysis leaves many serious problems unresolved, and is *a priori* in contradiction with adverbials being subject to strict licensing conditions. Towards the end of section 4 we approach an alternative analysis that explains the data in (1)-(3) but avoids these problems.

## **2. The Minimalist Framework**

### **2.1. Preliminaries**

The theory of syntax proposed in Chomsky (1995; 1998; 1999) and related work consists of a lexicon, a computational system, a PF (an articulatory-perceptual) and an LF (a conceptual-intentional) interface. The lexicon determines which lexical items enter into the computational system. The lexicon also specifies lexical items for their phonological, semantic, and formal features: phonological features are interpretable at the PF, semantic features at the LF interface level. Formal features, including person and number (i.e.  $\phi$ -features) and case features, are relevant only to the syntactic computation and are either interpretable or uninterpretable at LF: all uninterpretable formal features must be deleted for convergence before the derivation reaches LF.

The computational system takes derivations to PF and LF interface levels, by selecting lexical items and generating derivations, in a manner specified by the computational and economy principles of UG. The former

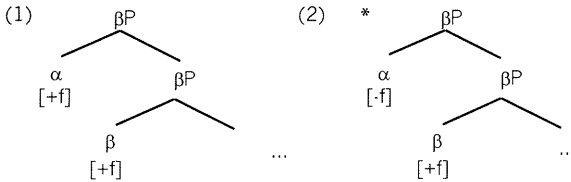
constrain the structure building operations Merge and Move, while the latter ensure that the derivations formed by the structure building operations are both convergent and optimal, satisfying certain natural economy conditions. Of the structure building operations, Merge selects two syntactic items X and Y, and combines them together, to form a new syntactic item Z; we follow the usual practice and call elements merging with a minimal X complements of X, while elements merging with a non-minimal X are specifiers of X. Move raises a syntactic item X from inside a structure already containing X, forming a chain CH = (X, t) where X is the moved syntactic item and t is its trace. In addition to Merge and Move, Chomsky (1998; 1999) discusses a third operation which he calls Agree: the operation Agree establishes a relation between syntactic items X and Y where X has interpretable features and Y has uninterpretable ones, and the uninterpretable features of Y delete—we give examples of the operations Merge, Move, and Agree in section 2.2.

Derivations formed by the operations Merge and Move yield pairs of representations  $(\pi, \lambda)$  where  $\pi$  is the PF representation interpreted at the articulatory-perceptual level, and  $\lambda$  is the LF representation interpreted at the conceptual-intentional level. At some point, an operation called Spell-out splits the derivation into two parts: one of them contains elements that are relevant only to  $\pi$ , the other elements that are relevant only to  $\lambda$ . The derivation converges at the PF and LF interface levels if both  $\pi$  and  $\lambda$  satisfy Full Interpretation. This means that neither  $\pi$  nor  $\lambda$  contains material that is uninterpretable at those levels— $\pi$  must not contain any indication of semantic features, for example, and  $\lambda$  of phonological or uninterpretable formal features. If either  $\pi$  or  $\lambda$  contains material that is uninterpretable at a particular interface level, then the derivation crashes, or is cancelled, at that level.

## 2.2. Phrase Structure

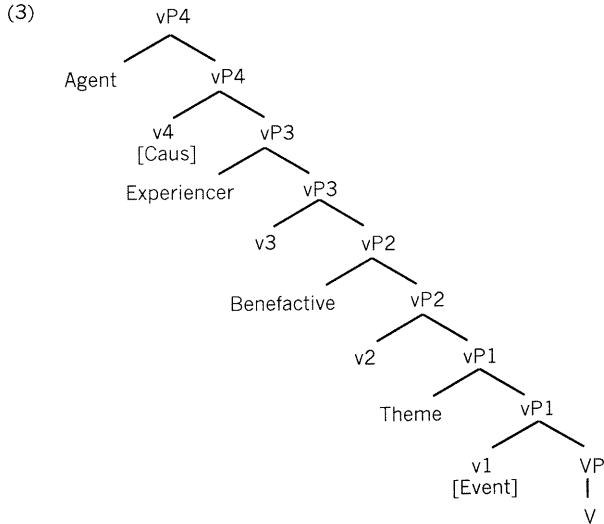
Derivations are formed by subsequent applications of the operations Merge and Move. Because within the Minimalist framework operations are permitted only if there is a reason for them, we must now address the question of what motivates Merge and Move. In the case of Merge, we assume, in line with Chomsky (1998: 50ff.; 1999) and related work, that a

syntactic item  $\alpha$  is merged to another syntactic item  $\beta$  iff some property of  $\beta$  is satisfied. One relevant property is selection so that a merger of  $\alpha$  to  $\beta$  satisfies the selectional feature of  $\beta$ . Selection has properties of Agree: this means that, in order to be merged to  $\beta$ ,  $\alpha$  must have the appropriate featural specification:



Theta structure and similar semantic roles are based on pure Merge of a syntactic item  $\alpha$  to a substantive head  $\beta$  or its projection (cf. Chomsky 1998; 1999). In the case of arguments of V, this means that  $\alpha$  is merged to V or a projection of V. Adopting Larson's (1988) theory of VP-shells, we assume that the VP-domain consists of a lexical VP and one or more "light" vPs, and the arguments of V are merged as specifiers of layered "light" vPs—for this view see also Bowers (1993), Chomsky (1995), Johnson (1991), and Koizumi (1995), among many others. We further assume that selection takes place configurationally as a structure  $\dots[_v v [_{VP} V\dots]]$  so that a merger of an argument  $\alpha$  to some particular  $v$  satisfies the selectional feature of  $v$ . Because the hierarchical ordering of  $v$  heads is fixed, the arguments in their specifier positions also end up with a fixed order. We take the lowest  $v$  to be an event-denoting head that assigns Theme theta role to the argument in its specifier position. The highest  $v$  is, in turn, an agentive or causative head, and it assigns Agent theta role to the argument in its specifier position.<sup>2</sup>

<sup>2</sup> On the assumption that  $\alpha$  can be merged to  $\beta$  if and only if the features of  $\alpha$  agree or are compatible with the features of  $\beta$ , we could assume that each light  $v$  head in Diagram (3) is associated with some kind of theta or semantic features. Note also that in the system proposed in Chomsky (1995; 1998; 1999) and Kayne (1994) Theme direct objects are

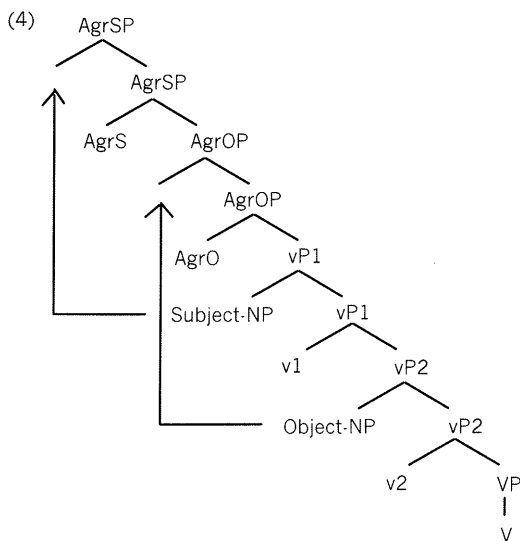


The lexical V moves from its original position to each v and functional head. This is because the lexical V is associated with features such as Voice, Aspect, and Tense, each of which needs checking in an appropriate functional projection: the checking takes place via head-to-head movement and adjunction of the lexical V to the appropriate functional head. The arguments of V may also move from their original VP-internal positions to the specifiers

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complements of V, while Agents are specifiers of an agentive or causative v. In line with Haider (1997), Hale & Keyser (1993), Koizumi (1994) and Manninen (1999) we assume however that all arguments of V are merged as specifiers of v heads. The hierarchical order of arguments of V is also discussed in Baker (1988; 1996; 1997), Bowers (1993), Grimshaw (1990), Hale & Keyser (1993), Larson (1988), and Stroik (1995).

of appropriate functional projections. In line with Koizumi (1995) and related work, we assume that subjects move to Spec/AgrSP, objects to Spec/AgrOP:<sup>3</sup>



The movements of the subject and object arguments to the appropriate Agr projections are triggered, firstly, by the uninterpretable  $\phi$ -features of Agr and case features of the arguments and, secondly, by the EPP-features of Agr. In other words, each Agr head has a set of  $\phi$ -features which must be deleted under Agree—if the  $\phi$ -set of Agr is not deleted, the derivation continues to contain uninterpretable features and crashes at LF. The  $\phi$ -set of Agr acts as a probe that seeks a goal, i.e. matching features which establish

<sup>3</sup> Chomsky (1998; 1999) proposes that subjects raise to Spec/T(ense)P, while Borer (1994) gives evidence for direct objects raising to Spec/AspectP. A full discussion of the issues involved is beyond the scope of this paper. Note, however, that what we call AgrOP has been called also Pred(ication)P, Tr(ansitive)P, and  $\mu$ P—see e.g. Bowers (1993), Collins (1997), and Johnson (1991).

agreement. The relation of the probe of Agr to its goal is the Agr-Associate relation or, more generally, the H(ead)-Associate relation. In Diagram (4), the case features of the subject and object NPs are the only choice of matching features which establish agreement so that the features of both the probe and goal can be deleted.

Diagram (4) illustrates a situation where each Agr also has an EPP-feature: the EPP-feature of Agr must be satisfied by moving the phrase determined by the goal of Agr's probe (=the NP) to Spec/AgrP. If Agr *lacks* an EPP-feature, it cannot be the target of movement: as a result, the NP must stay in situ, with long-distance agreement between the probe and its goal. Whether some particular functional head has an EPP-feature or not (i.e. whether it can be a target of movement or not) varies parametrically among languages. This is illustrated in (7)-(8) where the SVO ordering has been derived from an underlying SOV ordering, by leftward movement of the subject and the lexical verb across the direct object. In other words, because in languages like English, AgrO heads lack an EPP-feature, direct objects must stay in situ, with long-distance agreement between the probe and its goal. In languages like Icelandic and Finnish, there are reasons to believe however that the object undergoes movement to Spec/AgrOP—for Icelandic, this is shown by the fact that the object can appear either to the left or right of the negative adverb *ekki* (cf. Collins 1997, Collins & Thráinsson 1996):

**Japanese** (data from Koizumi 1995)

- (7) a. John-ga piza-o taberu  
       John-nom pizza-acc eats
- b. John-ga sigoto-o wasureta  
       John-nom job-acc forgot

**English**

- (8) a. John<sub>i</sub> eats<sub>j</sub> t<sub>i</sub> pizza t<sub>j</sub>  
       b. John<sub>i</sub> forgot<sub>j</sub> t<sub>i</sub> the job t<sub>j</sub>

**Icelandic** (data from Collins 1997)



- (9) a. Jón<sub>i</sub> las<sub>j</sub> bækurnar<sub>k</sub> ekki t<sub>i</sub> t<sub>k</sub> t<sub>j</sub>  
 John read the books not  
 'John did not read the books'
- b. Jón<sub>i</sub> las<sub>j</sub> ekki t<sub>i</sub> bækurnar t<sub>j</sub>

In the discussion so far, we have looked at how derivations are formed, in a fixed way, by the operations Merge and Move, and very little has been said about the surface (linear) ordering of elements. Within the Minimalist framework, structural hierarchy is thought to determine linear order universally: this is expressed in terms of the Linear Correspondence Axiom or, the LCA, to be discussed in the next section.

### 2.3. The Theory of Antisymmetry and LCA

Kayne (1994) develops a highly restricted theory of phrase structure and linear word order: he proposes, firstly, that structural hierarchy determines linear order universally and, secondly, that each hierarchical position can be associated with one and only one linear position. Thus, if two phrases XP and YP differ in hierarchical order, then they must also differ in linear order and vice versa. Kayne's intuition is formulated as the LCA which matches the notion of asymmetric c-command to linear precedence:

*Linear Correspondence Axiom:*

$d(A)$  is the linear ordering of  $T$ .

where  $A$  is a set of ordered pairs of nonterminals  $\langle X_j, Y_j \rangle$  such that  $X_j$  asymmetrically c-commands  $Y_j$  and  $T$  is a set of terminals.

*Asymmetric c-command:*

$X$  asymmetrically c-commands  $Y$  iff  $X$  c-commands  $Y$  and  $Y$  does not c-command  $X$ .

Let  $X, Y$  be nonterminals and  $x, y$  terminals such that  $X$  dominates  $x$  and  $Y$  dominates  $y$ . Then if  $X$  asymmetrically c-commands  $Y$ ,  $x$  precedes  $y$ .

Chomsky (1995: 334ff.) adopts a version of the LCA. While Kayne argues that the LCA is a formal condition on the shape of phrase markers and operates everywhere, including LF, Chomsky proposes that it is relevant only in the PF component of the grammar, because of PF demands. The

crucial difference between Kayne and Chomsky's versions of the LCA is, then, that for Kayne a non-linearized phrase marker is ill-formed in itself, and the derivation crashes at both LF and PF, whereas for Chomsky it is ill-formed only at PF so that the derivation crashes only at PF.

### 3. The Licensing and Distribution of Adverbials

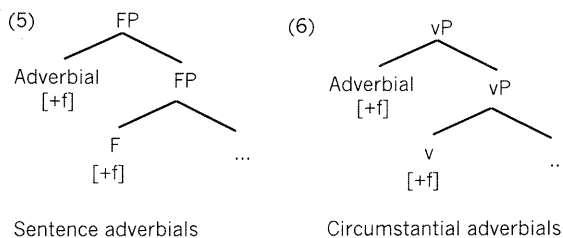
After having introduced the Minimalist phrase structure theory and the LCA, we now move on to the question of how, and in what structural positions, circumstantial adverbials such as those in (1)-(3) are licensed. We begin by discussing the feature-based theories of adverbials which put forward the hypothesis that adverbials are licensed in strict one-to-one relations with functional and light *v* heads (section 3.1.). We then examine the hierarchical positions of circumstantial manner, place, and time adverbials with regard to both arguments of V (section 3.2.), and with regard to each other (section 3.3.).

#### 3.1. Preliminaries

Within the feature-based theories of adverbials of Alexiadou (1997), Laenzlinger (1998), and Cinque (1999) sentence adverbials are merged as the unique specifiers of functional heads, while VP adverbials, including circumstantial manner, place, and time adverbials, are merged as the unique specifiers of light *v* heads. In both cases, the merger takes place because some property of the selecting functional or light *v* head must be satisfied. There is always agreement between the adverbials and the functional or *v* heads, so that adverbials are licensed through featural mechanisms similar to those involved in the licensing of arguments of V. Because functional and *v* heads have a fixed hierarchical order, this line of analysis predicts that the adverbials in their specifier positions also end up having a fixed order:<sup>4</sup>

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<sup>4</sup> Feature-based licensing mechanisms for adverbials were first proposed in Travis (1988). Ernst (1998b) argues against the view that there is a one-to-one licensing relation between adverbials and functional/light *v* heads; in his system, adverbials are licensed through



Given that theta structure and similar semantic roles are based on pure Merge of a syntactic item  $\alpha$  to a substantive head  $\beta$  or its projection (i.e. to V or a projection of V), our first question is whether circumstantial adverbials, because they are merged as specifiers of light v heads, are also assigned a thematic or semantic role. A number of authors, including Alexiadou (1997), Chomsky (1965), Ernst (1998b), Grimshaw (1990), Larson (1988), and McConnell-Ginet (1982), have proposed that circumstantial adverbials might be similar to arguments of V in that they are assigned a(n optional) theta role. Circumstantial adverbials also modify the sentence's core event variable, and are parallel to referential NPs in that they restrict the range of events denoted by the verb. A further similarity between circumstantial adverbials and arguments of V is that they involve selection which is related to the lexical properties of V:<sup>5</sup>

- (10) a. I live \*(comfortably).  
 b. I take my duties \*(seriously).

- (11) a. I live \*(in Paris).  
 b. I put the book \*(on the table).

semantic (scopal) requirements. For more discussion, the reader is referred to Ernst's work.

<sup>5</sup> While the idea that "argumental" adverbials such as those in (10)-(11) are assigned theta roles is relatively uncontroversial, the idea that all circumstantial adverbials are assigned such roles is less so. For more discussion, the reader is referred to the literature.

Given that circumstantial adverbials are merged as specifiers of *v* projections, and the order of *v* projections is fixed, our second question is whether circumstantial adverbials appear in structurally higher or lower positions than arguments of *V*—we address this question in the next section.

### 3.2. The Hierarchical Order of Adverbials and Arguments of *V*

A number of authors, including Adger & Tsoulas (1999), Alexiadou (1997), Larson (1988) and Manninen (1999; 2000), have proposed that arguments of *V* are structurally superior to circumstantial manner, place, and time adverbials (i.e. that arguments of *V* are merged as specifiers of higher *v*Ps than such adverbials). This is supported by the fact that Theme direct objects, which are the lowest arguments of *V*, are able to *c*-command and bind into the adverbials:<sup>6</sup>

#### Anaphor binding:

- (12) a. She treated every dog<sub>i</sub> better than its<sub>i</sub> owner.  
 b. She interviewed each director<sub>i</sub> in his<sub>i</sub> office.  
 c. She kissed every boy<sub>i</sub> on his<sub>i</sub> birthday.

#### Negative polarity:

- (13) a. She saw no one in any of those ways.  
 b. \*She saw anyone in none of those ways.  
 c. She saw no one anywhere.  
 d. \*She saw anyone nowhere.  
 e. She saw no one on any of those days.  
 f. \*She saw anyone on none of those days.

#### Superiority:<sup>7</sup>

- (14) a. Who did you see how?

<sup>6</sup> As the reader can verify, similar relation also holds between other arguments (e.g. Agents, Benefactives) and circumstantial adverbials. We define here the notion of *c*-command in the usual way so that *X* *c*-commands *Y* if *Y* is a sister of *X* or *Y* is dominated by a sister of *X*. Note that there is a difference between *c*-command and asymmetric *c*-command (e.g. Kayne 1994): while the former allows *X* and *Y* to reflexively *c*-command each other, the latter does not.

<sup>7</sup> Superiority effects are attributed to economy conditions on derivations, so that an element  $\alpha$  cannot move to Spec/*XP* if there is an element  $\beta$  such that the movement of  $\beta$  to Spec/*XP* produces a shorter and hence a less costly move, resulting in a more economical derivation.

- b. \*How did you see who?
- c. Who did you see where?
- d. \*Where did you see who?
- e. Who did you see when?
- f. \*When did you see who?

**Weak crossover:<sup>8</sup>**

- (15) a. ?I saw a picture of its owners in that house.
- b. \*Which house did you see a picture of its owners in?
- c. ?I read a poem about its sunset on the day of the solar eclipse.
- d. \*Which day did you read a poem about its sunset?

However, there are also alternative analyses. Stroik (1995: 66ff.) takes sentences like (16a-c) to suggest that manner adverbials appear in structurally higher, place and time adverbials in structurally lower, positions than Theme direct objects. He claims that in (16a), the direct object *it* is too low down in the structure to c-command and bind into the adverbial containing the R(eferential)-expression *The Wasteland*. Hence the R-expression is free and the sentence is grammatical. In (16b-c), Stroik continues, the direct object *it*, because it appears in a structurally higher position than the place or time adverbial containing the R-expression *The Wasteland*, is able to c-command and bind into the adverbial. This causes a Principle C violation, and the sentences are ungrammatical.<sup>9</sup>

- (16) a. John recited Mary  $it_i$  [without knowing “The Wasteland $_i$ ” very well].
- b. ?\*John recited Mary  $it_i$  [in the room where he had memorized “The Wasteland $_i$ ”].
- c. ?\*John recited Mary  $it_i$  [while he was reading “The Wasteland $_i$ ”].

But Stroik’s analysis is not only problematic but also wrong. First, most native speakers find all of (16a-c) flagrantly ungrammatical, even without any issues of coreference—the same is true also for other languages. (17)-(18) strongly indicate that the ungrammaticality is due to the fact that verbs

<sup>8</sup> Standard weak crossover effects are attributed to the fact that a variable such as a trace left by a moved Wh-phrase cannot be coindexed with a pronoun to its left.

<sup>9</sup> Binding theory Principle C states that R-expressions must always be free in their sentence. This means that there must be no element X in the sentence which both c-commands and is coindexed with the R-expression.

like *recite* do not easily allow double object constructions, as well as to the fact that even verbs that do allow such constructions cannot have a full NP like *Mary* followed by a weak pronoun like *it* (cf. Cardinaletti & Starke 1995):

- (17) a. \*John recited Mary it.  
 b. ??John recited Mary the poem.

- (18) a. \*John gave Mary it.  
 b. John gave Mary the poem.

Second, as shown by (19)–(20), even in sentences which lack the problematic double object construction, manner adverbials cause a clear Principle C violation—this strongly supports our earlier view that manner adverbials, just like place and time adverbials, appear in a lower Spec/vP than direct objects:

- (19) a. \*John recited it<sub>i</sub> [without knowing “The Wasteland<sub>i</sub>” very well]  
 b. John recited it<sub>i</sub> [without knowing it<sub>i</sub> very well]
- (20) a. \*John sang it<sub>i</sub> [as beautifully as his mother had sung “Ave Maria<sub>i</sub>”]  
 b. John sang it<sub>i</sub> [as beautifully as his mother had sung it<sub>i</sub>]

After having determined the hierarchical order of circumstantial manner, place, and time adverbials with regard to arguments of V, we now move on to discuss the mutual ordering of such adverbials in section 3.3.

### 3.3. The Hierarchical Order of Adverbials

The idea of a strict one-to-one relation between circumstantial adverbials and light *v* heads, and the fixed order of *v* heads, predict that the order of circumstantial adverbials is also fixed. In the previous section, we used tests based on syntactic relations like *c-command* to determine the hierarchical position of adverbials with regard to arguments of V. However, if we apply such tests to adverbials we see that they give us no evidence of their mutual ordering. Based on sentences like (21a–b) and (22a–b) we could assume that manner adverbials are structurally superior to place and time adverbials, while (21c–d) and (22c–d) suggest quite the opposite so that both place and

time adverbials are structurally superior to manner adverbials:

**Negative polarity**

- (21) a. I danced tango [in none of those ways] [in any of those places]  
 \*I danced tango [in any of those ways] [in none of those places]
- b. I danced tango [in none of those ways] [on any of those days]  
 \*I danced tango [in any of those ways] [on none of those days]
- c. I danced tango [in none of those places] [in any of those ways]  
 \*I danced tango [in any of those places] [in none of those ways]
- d. I danced tango [on none of those days] [in any of those ways]  
 \*I danced tango [on any of those days] [in none of those ways]

**Principle C:**

- (22) a. I danced tango better than her<sub>i</sub> in (\*Mary<sub>i</sub>'s)/ her<sub>i</sub> garden shed.  
 b. I danced tango better than her<sub>i</sub> on (\*Mary<sub>i</sub>'s)/ her<sub>i</sub> birthday.  
 c. I danced tango in her<sub>i</sub> garden shed better than (\*Mary<sub>i</sub>)/ her<sub>i</sub>.  
 d. I danced tango on her<sub>i</sub> birthday better than (\*Mary<sub>i</sub>)/ her<sub>i</sub>.

A number of other criteria have been proposed for determining the hierarchical order of circumstantial adverbials. First, the data in (23) appear to show that place and time adverbials are structurally superior to manner adverbials—on the assumption that particles are generated next to V, the facts follow if manner adverbials are closer to V than either place or time adverbials (e.g. Adger & Tsoulas 1999; Ernst 1998b):

- (23) a. She went angrily away.  
 b. ??She went northwards away.  
 c. ??She went yesterday away.

The problem with this criterion is however that only adverbs, but not PPs, can appear between the lexical V and the particle—this is shown by (24a-b). Another problem is that not all particles allow even adverbs in between themselves and the lexical V—this is shown in (25a-b):

- (24) a. ??She went in an angry way away.  
 b. ??She went in a very hasty manner away.  
 (c. She went away in an angry way)  
 (d. She went away in a very hasty manner)
- (25) a. ??She put everyone rudely off.  
 b. ??She ate the peas sloppily up.  
 (c. She put everyone off rudely)  
 (d. She ate the peas up sloppily)

Sentences like (26)-(27) also suggest that place and time adverbials might be structurally superior to manner adverbials. Building on Zubizarreta (1998) Adger & Tsoulas (1999) take the fact that sentences like (26b) and (27b) are well-formed only when there is a clear prosodic break between the two adverbials to show that there has been movement, possibly in the prosodic component of the grammar:

- (26) a. I danced tango slowly in a garden shed.  
 b. ??I danced tango in a garden shed slowly.
- (27) a. I danced tango slowly in the morning.  
 b. ??I danced tango in the morning slowly.

However, rather than manner and place or time adverbials, these sentences involve a difference between intonationally “light” adverbs and intonationally “heavy” PPs. (28)-(29) show that the adverbials, when they are of equal intonational weight, are again allowed to permute freely with regard to each other—this suggests that intonational weight is a property affecting linear, rather than hierarchical, ordering:

- (28) a. I danced tango in a most graceful way in a garden shed.  
 b. I danced tango in a garden shed in a most graceful way.
- (29) a. I danced tango in a most graceful way in the morning.  
 b. I danced tango in the morning in a most graceful way.

On the basis of the preceding data and discussion, we might be tempted to conclude that circumstantial adverbials cannot be unambiguously hierarchically ordered with regard to each other after all—this would, however, be a priori contradictory to our earlier view that there is a strict



one-to-one licensing relation between circumstantial adverbials and light *v* heads, as well as to the idea that the order of *v* heads is fixed. Another problem that we are now facing is that, even if we maintain the idea that circumstantial adverbials are unambiguously hierarchically ordered with regard to each other, it is unclear why this ordering is not mapped onto an unambiguous linear order. We discuss both of these problems in section 4. Towards the end of section 4, we approach an alternative analysis which explains the data, but avoids these problems.

#### 4. The Hierarchical and Linear Order of Circumstantial Adverbials

In section 3, we introduced the idea that circumstantial adverbials are licensed in strict one-to-one relations with light *v* heads bearing the relevant features. Because the order of *v* heads is fixed, we assumed that the order of circumstantial adverbials is also fixed. Yet we were unable to determine what this fixed order of circumstantial adverbials might be. This, together with the fact that circumstantial adverbials are allowed to permute in sentences like (1)-(3), suggests that **(i)** they are *not* unambiguously hierarchically ordered after all; **(ii)** they *are* unambiguously hierarchically ordered but their ordering can change because of movement or; **(iii)** they *are* unambiguously ordered but their ordering does not determine an unambiguous or *total* linear ordering.

In this section, we examine each of these options in more detail. We begin with a discussion of how the different linear orders in (1)-(3) could reflect different structural hierarchies, either as a result of “base-generation” (section 4.1) or as a result of movement (section 4.2). We then approach an alternative analysis which relies on the idea that, under some particular conditions, unambiguous hierarchical orders need not be mapped onto total linear orders (section 4.3).

##### 4.1. Different Underlying Structures?

As already noted, options **(i)** and **(ii)** are based on the view that the sentences in (1)-(3) can differ in linear order iff they differ in hierarchical order so that the same lexical items appear in different structural positions. Under **(i)**, we could assume that the different linear orders in (1)-(3) reflect different underlying or “base-generated” structures. This means rejecting the idea of a

strict one-to-one correspondence between circumstantial adverbials and light *v* heads and assuming instead that the adverbials can be merged as specifiers of *any v* head. A related view would be to say that, although there *is* a strict one-to-one mapping between adverbials and *v* heads so that for each adverbial there exists an agreeing *v* head, the order of the *v* projections is not fixed (cf. Cinque 1999; Ernst 1998b).

Both lines of analysis are equally problematic. First, while we still want to maintain the idea of a one-to-one relation between functional heads and sentence adverbials, and *v* heads and arguments of *V*, we are forced to stipulate that this does not hold for circumstantial adverbials—in other words circumstantial adverbials represent a significant exception to the way in which both adverbials and arguments of *V* are licensed. Second, such analyses predict that the computational system of language is able to form different types of derivations, by utilising the same set of linguistic items. But because the sentences in (1)-(3) are synonymous, it would be neither elegant nor restrictive to say that once the derivation is formed in one way and once in another way with the same meaning, by the computational system of language.

#### 4.2. Movement?

An alternative analysis would be to say that the sentences in (1)-(3), although they have the same underlying structures, involve movement. On this view, while one of the sentences directly reflects the original underlying structure, the others reflect a *derived* structure. However, although the idea that different linear orders are created by moving some lower sentence elements across the higher sentence elements allows us to account for sentences like (4)-(6) which involve a change in focus structure, it is problematic for the analysis of sentences like (1)-(3). This is because within the Minimalist framework, movement is triggered by uninterpretable features of the probe and its goal. But in (1)-(3) it is unclear what triggers the movement of the circumstantial manner, place, and time adverbials across one another as it is not immediately obvious what functional heads would have the relevant features acting as probes, and what features of the circumstantial adverbials would identify them as the matching goals, establishing agreement. The adverbials have no case features which play a role in movement to

Spec/AgrP, and because they display free linear ordering without entailing any focussing effects, it is not reasonable to suppose that they have some kind of focus features either which motivate their movement to the specifier of a FocusP. Another problem with the movement analysis is that the sentences in (1)-(3) are synonymous: on this view, it is not reasonable to suppose that once the manner adverbial is raised across the place and time adverbials, and once the place and time adverbials move across the manner adverbials, to the specifiers of appropriate functional projections.<sup>10</sup>

### 4.3. An Alternative Analysis

In the previous sections we have seen that the idea of the different linear orders in (1)-(3) reflecting different hierarchical structures, either as a result of “base-generation” or movement, is problematic. In this section, we approach an alternative analysis: we propose that unambiguous hierarchical orders do not always correspond to total linear orders. We begin by discussing total and nontotal orders in section 4.3.1. We then examine why some elements are exempted from asymmetric c-command relations (section 4.3.2.). Our core analysis is presented in section 4.3.3.

#### 4.3.1. Total vs Nontotal Ordering

Within Kayne’s (1994: 4) theory of LCA, a linear ordering must satisfy three requirements: it must be *transitive*, so that if an element X precedes Y and Y precedes Z, then X also precedes Z; *total*, so that all members of a set are linearly ordered with regard to all other members of that set (i.e. for all distinct elements X and Y we must determine whether X precedes Y or Y precedes X); and *antisymmetric*, so that a linear order “X precedes Y” is

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<sup>10</sup> In other words because within the Minimalist framework movement is linked to the interface with the conceptual-intentional module (LF), it would be against the restrictive nature of the theory to assume that there exist movement which does not have effects at the interface. Note that, because in sentences like (4)-(6) a change in linear ordering entails clear focussing effects, we can safely assume, in line with Zubizarreta (1998), that the adverbial has undergone movement to a left-branching specifier of a functional projection or, as proposed by Belletti & Shlonsky (1995), the direct object has undergone movement to a right-branching specifier of a FocusP. A more detailed discussion of these analyses is beyond the scope of this paper, and the reader is referred to the literature.

incompatible with the order “Y precedes X.” However, Chomsky (1995, 334ff.) proposes a relaxation of the requirement for totality, so that nontotal orders are admissible when X and Y have no phonological realisation (i.e. when X and Y have no interpretation at the PF interface level, they need not be assigned a temporal order, traces being a case in point). We take the well-formedness of sentences like (1)-(3) to suggest a further relaxation of the requirement for totality: under some particular conditions, we hypothesize that nontotal orders are admissible even when X and Y do have a phonological realisation, i.e. even when X and Y are pronounced and have an interpretation at PF.

The natural question, at this point, is what the conditions are that permit unambiguous hierarchical structures to determine such nontotal linear orders. To answer this question, we examine the structure of the sentences in (1)-(3) more closely:

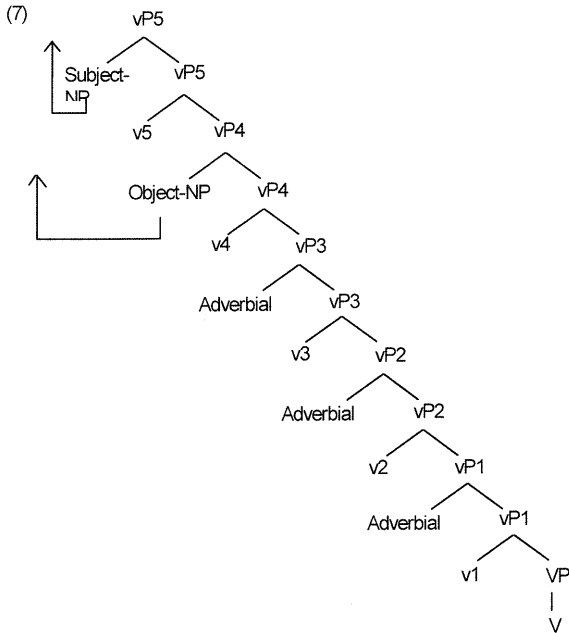


Diagram (7) shows how the subject and object arguments move to the appropriate Agr projections, to satisfy the EPP-features of Agr. Even when Agr heads lack an EPP-feature, the arguments enter into H-Associate relations with them. However, because the circumstantial adverbials in (1)-(3) have no features which would identify them as the goal of some functional head's probe, they neither move nor enter into H-Associate relations with clausal functional heads.

Turning now to the linear order of (1)-(3) we see that the subject and object arguments are always ordered with regard to the adverbials (i.e. we are able to determine that they always precede the adverbials). However, no order can be established for the adverbials: we are unable to determine whether the manner adverbials should precede or follow the place adverbials, and whether the place adverbials should precede or follow the time adverbials. This suggests that the ability of the adverbials to permute might be related to the fact that they remain in their original VP-internal positions throughout the derivation, and do not enter into H-Associate relations with outside functional heads.

But how can we capture this idea? Within Kayne's system, we have seen that asymmetric c-command directly corresponds to linear precedence so that if X asymmetrically c-commands Y, then X precedes Y. We now take this to mean that if X and Y are not *visible* to the asymmetric c-command relation, they cannot be linearly ordered by it either. Based on Diagram (7), we hypothesize that X and Y are not visible to the asymmetric c-command relation if they both appear in specifiers of layered vPs—we redefine the notion of asymmetric c-command in such a way that X asymmetrically c-commands Y iff X c-commands Y and Y does not c-command X, and both X and Y are not specifiers of layered vPs. On this view, we are able to predict, correctly, that the subject, because it raises to Spec/AgrSP, asymmetrically c-commands and therefore also precedes the object and each of the circumstantial adverbials. Second, the object, because it raises to Spec/AgrOP, asymmetrically c-commands, and precedes, the adverbials. However, because the adverbials remain in the specifiers of layered vPs throughout the derivation and do not enter into H-Associate relations with outside functional heads, we are again able to predict, correctly, that no

asymmetric c-command relation can be established between them. And as the notion of asymmetric c-command is matched to linear precedence, it follows that the adverbials cannot be linearly ordered by the LCA.<sup>11</sup>

However, derivations are interpretable at the PF interface level only if they are presented in a particular form—with temporal order, prosodic and syllable structure, and certain phonetic properties and relations (Chomsky 1998: 7). On this view, the hypothesis that circumstantial adverbials cannot be linearized by the LCA should lead to a violation of Full Interpretation at PF, so that the derivation crashes at PF. To rescue the structures we propose that, elements which have phonological content but which fail to be linearly ordered by the LCA are assigned a *random* temporal order in the PF component of the grammar. This allows us to explain why the sentences in (1)-(3) are synonymous, so that it does not seem to matter whether the manner adverbials precede or follow the place adverbials, and whether the place adverbials precede or follow the time adverbials. We further propose that the PF component might be sensitive to properties like intonational weight: on this view, if two elements X and Y are created a random temporal order in the PF component of the grammar, then that ordering is such that intonationally light elements precede intonationally heavy elements—this allows us to explain the difference between sentences like (26)-(27) and (28)-(29).

### 4.3.2. Why Layered vPs?

In the previous section, we proposed that two elements X and Y are not visible to the asymmetric c-command relation if they both appear in specifiers of layered vPs. In this section, we examine *why* such elements are not visible to this relation. First of all, it has been proposed that X and Y are visible to the asymmetric c-command relation only if they have been displaced (e.g. Koster 1999; Yang 1999). We could take this line of

<sup>11</sup> Note that this particular relaxation of the requirement for totality is only meant to apply to situations in which both X and Y are specifiers of vPs. This allows us to still exclude other constructions violating the requirement for totality. For example, multiple-branching constructions such as [<sub>XP</sub> X [YP] [ZP]] are excluded on the basis of YP and ZP being in too symmetric a relation: because neither YP nor ZP asymmetrically c-commands the other, the d(A) lacks the pair involving these two elements and so does not meet the totality requirement.

reasoning slightly further and argue that only elements which have been moved or which enter into H-Associate relations with clausal functional heads are visible to this relation. After all, we have just seen how subjects and objects, both of which move or enter into H-Associate relations with functional Agr heads, are able to asymmetrically c-command all structurally lower elements, while no such relation can be established between circumstantial manner, place, and time adverbials, none of which moves or enters into an H-Associate relation with an outside functional head. However, this line of analysis would wrongly predict that sentence adverbials are not visible to the asymmetric c-command relation either, and cannot therefore be linearized by the LCA (sentence adverbials neither move nor enter into H-Associate relations with outside functional heads). But the grammaticality of the following (a)-sentences and the ungrammaticality of the (b)-sentences shows straightforwardly that this is incorrect:

**English**

- (30) a. John always completely loses his cool.  
 b. \*John completely always loses his cool.

**Italian** (data from Cinque 1999)

- (31) a. Gianni ha sempre completamente perso la testa per lei.  
 'Gianni has always completely lost his mind for her'  
 b. \*Gianni ha completamente sempre perso la testa per lei

**French** (data from Cinque 1999)

- (32) a. Jean a toujours complètement perdu la tête pour elle.  
 b. \*Jean a complètement toujours perdu la tête pour elle.

To rescue the situation we could assume that only elements in functional projections or elements entering into H-Associate relations with functional projections are visible to the asymmetric c-command relation so that they can be linearized by the LCA. However, this line of analysis would fail to explain why elements in the specifiers of functional projections are sometimes also allowed to permute with regard to each other, without a drastic change in grammaticality or the focus structure of the sentence. Rizzi

(1997) has proposed, for example, that the CP-domain of each sentence can contain as many Topic projections as there are topicalisable elements. As shown by (33)-(34), the topicalised elements, while they are allowed to permute freely with regard to each other, are not allowed to permute with regard to the other sentence elements:<sup>12</sup>

**Italian** (data from Rizzi 1997)

- (33) a. Credo che domani, a Gianni, QUESTO gli dovremmo dire.  
 'I believe that tomorrow, to Gianni, THIS we should say'
- b. Credo che a Gianni, domani, QUESTO gli dovremmo dire.
- (34) a. \*A chi, il premio Nobel, lo daranno?  
 'To whom, the Nobel prize, will they give it?'
- b. Il premio Nobel, a chi lo daranno?  
 'The Nobel prize, to whom will they give it?'
- c. Un uomo a cui, il premio Nobel, lo daranno senz'altro.  
 'A man to whom, the Nobel Prize, they will give undoubtedly'
- d. \*Un uomo, il premio Nobel, a cui lo daranno senz'altro.  
 'A man, the Nobel Prize, to whom they will give undoubtedly'

There are some important similarities between the data in (1)-(3) and in (33) which now point us towards an alternative analysis, to be discussed in section 4.3.3.

### 4.3.3. Segments vs Categories

In the preceding sections, we have seen that the circumstantial manner, place, and time adverbials in (1)-(3) and the topicalised elements in (33) occupy specifier positions of layered v and Topic projections—we illustrate this in the following way:

$$\dots [{}_{\text{VP/TopicP}} \text{XP}] [{}_{\text{VP/TopicP}} \text{v/Topic}] [{}_{\text{VP/TopicP}} \text{YP}] [{}_{\text{VP/TopicP}} \text{v/Topic} \dots]$$

<sup>12</sup> Rizzi points out that in sentences (34) the topicalised elements must always precede a [+Wh] question operator in direct main questions, but follow a [+Wh] relative operator.



The analysis that we now propose for both (1)-(3) and (33) is based on the *category/segment* distinction of May (1985) which is motivated independently. Crucially, both Chomsky (1995: 334ff.) and Kayne (1994: 15ff.) adopt the view that asymmetric c-command is always restricted to categories, and segments of a single category XP do not enter into such relations—this distinction is necessary or else the theory will not allow any specifiers/adjoined phrases. Taking the category/segment distinction slightly further we hypothesize that, rather than being completely independent categories, layered vPs and TopicPs behave more like segments of a single, multiply-layered category VP/TopicP with regard to syntactic relations such as asymmetric c-command. In other words, we propose that elements in the layered vPs and TopicPs can only asymmetrically c-command elements which appear *outside* the category VP/TopicP. This line of analysis allows us to predict, correctly, that because circumstantial adverbials appear in different segments of one and the same category VP, they cannot enter into an asymmetric c-command relation with regard to each other and cannot therefore be linearized by the LCA. The same is true of elements appearing in layered TopicsPs: because such elements appear in different segments of one and the same category TopicP, they cannot enter into an asymmetric c-command relations with regard to each other, and they cannot therefore be linearized by the LCA. However, they *can* enter into asymmetric c-command relations with elements *outside* the one and the same multiply-layered category TopicP; this explains the data in (34).

Generalizing, we are proposing that, rather than just vPs and TopicPs, elements in the different segments of one and the same multiply-layered category XP cannot enter into asymmetric c-command relations with regard to each other. However, such elements can enter into such relations with elements *outside* the multiply-layered category XP. This means that, in structures such as the following,  $\alpha$ P asymmetrically c-commands, and therefore precedes,  $\beta$ P,  $\chi$ P, and  $\delta$ P. While  $\beta$ P and  $\chi$ P asymmetrically c-command and precede  $\delta$ P, they do not asymmetrically c-command each other, by virtue of appearing in different segments of one and the same multiply-layered category XP. As  $\beta$ P and  $\chi$ P cannot be linearized by the LCA, they are created a random temporal order in the PF component of the grammar, to satisfy PF demands:

$$\dots[_{VP} \alpha P [_{VP} Y^0 [_{XP2} \beta P [_{XP2} X^02 [_{XP1} \chi P [_{XP1} X^01 [_{ZP} \delta P [_{ZP} Z^0 \dots]]]]]]]]]]]$$

## 5. Conclusion

In this paper, we addressed the question of why sentence-final manner, place, and time adverbials are allowed to permute with regard to each other, but not with regard to the other sentence elements. We began by discussing briefly the Minimalist view on language. We also introduced the feature-based theories of adverbials and Kayne's (1994) theory of antisymmetry and LCA which state that hierarchical structure reflects linear ordering universally. After having examined why the sentences in (1)-(3) are problematic for such theories we proposed that, rather than always determining a total linear ordering, unambiguous hierarchical orders can sometimes determine *nontotal* orders. In particular, we proposed that elements appearing in different segments of one and the same multiply-layered category XP are not visible to the asymmetric c-command relation, and they cannot therefore be linearized by the LCA. In order to avoid a crash at PF, such items are assigned a random temporal order in the PF component of the grammar. We then showed how this line of analysis explains the data in (1)-(3), as well as in sentences like (33)-(34), without raising any of the problems encountered by the alternative analyses.

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