

THE POSITION OF PREPOSITIONAL MODIFIERS IN THE ADVERBIAL SPACE

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1. Introduction

In Schweikert (2005) I showed that prepositional sentence modifiers can be grouped into several classes according to the thematic role that they express (section 3). These thematic roles respect a base order analogous to that of Cinque's hierarchy of adverbs and functional heads (section 2). What was missing so far was the relationship of two hierarchies. Here, I want to fill this gap, using scope interpretations of adverbs with respect to the prepositional modifiers (section 4). I will show that we can use these properties to detect the positions of the thematic roles inside the Cinque hierarchy. Section 5 will propose a possible derivation of surface order and scope properties.

2. Cinque's hierarchy of functional projections

For a long time sentential modifiers such as adverbs and prepositional phrases were considered to be sitting in a position adjoin either to VP (or vP in VP shell theories) or IP. The situation changed with the publishing of Kayne (1994). In his antisymmetric theory there is only one adjunct position available for each projection, which could be identified with the specifier position. Since sentences can easily have more than two adverbs, for each of them there had to be a different specifier position available. Cinque (1999) offered a solution to the problem. He started from the observation that adverbs can be divided into different classes which among themselves obey a (nearly) strict ordering relation. Cross linguistic research from many different languages shows that this order seems to be universal. Furthermore, Cinque showed that this order is mirrored in a correspondent order of verbal affixes, also universal. If the affixes are realised as suffixes they always appear in reverse order. If they are prefixes, in most cases they obey the same order as the adverbs. Only in few languages such as Navajo they appear in reverse order. To explain this behaviour Cinque (1999) proposed a universal hierarchy of functional projections

above the VP (shell). Affixes, certain auxiliaries and modals are sitting in head positions of these projections. Their specifier can host the associated adverbial phrases. Subsequent research from many languages revealed the validity of this universal hierarchy. I present here the hierarchy with its original labels together with prototypic adverbs in English and Italian as originally presented in Cinque (1999) and my own translation into German.

Funct. Proj.	English	Italiano	German
Mood _{speech act}	frankly	francamente	offen gesagt ehrlich gesagt
Mood _{evaluative}	fortunately	fortunatamente	glücklicherweise
Mood _{evidential}	allegedly	evidentemente	angeblich offensichtlich
Mod _{epistemic}	probably	probabilmente	wahrscheinlich
T (Past)	once		einmal
T (Future)	then	ora?	jetzt, dann
Mood _{irrealis}	perhaps	forse	vielleicht
Mod _{necessity}	necessarily	necessariamente	notwendigerweise unbedingt zwangsläufig
Mod _{possibility}	possibly	possibilmente	möglicherweise
Mod _{volition}	willingly	volontariamente	gerne freiwillig
Mod _{obligation}	inevitably		unausweichlich zwangsläufig
Mod _{ability, permission}	cleverly	intelligentemente	klugerweise geschickt
Asp _{habitual}	usually	solitamente di solito usualmente normalmente	normalerweise gewöhnlich
Asp _{repetitive I}	again	di nuovo	wieder noch einmal
Asp _{frequentative I}	often	spesso	oft
Asp _{clarative I}	quickly	rapidamente	schnell
T (Anterior)	already	già poi non...ancora	schon
Asp _{terminative}	no longer	non ... più	nicht mehr nicht länger

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Asp _{continuative}	still	ancora	noch
Asp _{perfect}	always	sempre mai	immer nie
Asp _{retrospective}	just	appena recentemente ultimamente	gerade eben gleich
Asp _{proximative}	soon	presto?	bald
Asp _{durative}	briefly	brevemente	kurz knapp
Asp _{generic/progressive}	characteristically		typisch
Asp _{prospective}	almost		fast beinahe
Asp _{SgCompleative I}	completely	completamente parzialmente interamente in parte	komplett vollständig völlig
Asp _{PlCompleative}	everything	tutto niente	alles
Voice	well	bene molto poco, male	gut
Asp _{clarative II}	fast early		schnell früh
Asp _{SgCompleative II}	completely		komplett völlig total
Asp _{repetitive II}	again	di nuovo	wieder
Asp _{frequentative II}	often	frequentemente	oft

3. The hierarchy of thematic roles

In Schweikert(2005) I established a syntactic order of thematic roles, usually expressed by means of modifying prepositional expression. I used mainly three syntactic tests in order to find out whether these roles have different base positions.

In the Quantifier Scope Test I tested sentences with two prepositional phrases in the Mittelfeld, one modified by a universal and the other by an existential quantifier. In case of movement I could detect a scope ambiguity of the moved quantifier:

- (1) Hans hat in mindestens einer Stadt an jedem Tag gearbeitet.
Hans has in at_least one city on every day worked
'Hans worked every day in at least one city.'

This sentence is ambiguous between the interpretation:

There is at least one city in which Hans worked on each day.

and

For each day there exists at least one city – not necessarily the same – in which Hans worked on this special day.

This ambiguity does not exist in case of base order – or at least is less salient.

The Pair List Reading test exploits the fact that wh-elements that have moved across a universal quantifier allow for a list of answers.

- (2) Wo hat Hans an jedem Tag gearbeitet?
Where has Hans on every day worked
'Where did Hans work each day?'

This question allows two types of answers. The first consist of just one place, for instance "Venice". The other possible type is a list which consists of pairs of days and places, e.g. "On Monday he worked in Venice, on Tuesday he worked in Paris, ...". This kind of list is not possible if the questioned element starts from position above the universal quantified element.

The Informational Focus test makes use of the focus properties in the German Mittelfeld. There are two strategies of putting one element in the Mittelfeld into focus. One strategy is "focus in situ" and the other "focus to the right". If there are two elements in the Mittelfeld and the lower element is to be set into focus these strategies coincide. For the higher element two different orders result. If for example the question is:

- (3) Wann hat Hans in Venedig gearbeitet?
'When did Hans work in Venice?'

two answers are possible:

- (4) Hans hat AM DIENSTAG in Venedig gearbeitet.

and

- (5) Hans hat in Venedig AM DIENSTAG gearbeitet.

These three tests gave as a surprisingly coherent result a base order of at least 15 distinct roles. Unlike the more rigid adverbial order of Cinque's hierarchy, however, PPs provide more flexibility. The basic order between two PPs, let's say a causal and a locative expression, can be reversed for instance for scope reasons. If we have a sentence like

- (6) Vincent hat wegen des guten Lichtes in Arles gemalt.
Vincent has because_of the good light in Arles painted
'Vincent painted in Arles because of the splendid light.'

the meaning is not an intersection of one event of painting in Arles with its reason (because of the splendid light) and its place (in Arles). The meaning is rather that the splendid light (in Arles) had an influence on the choice of the place. Thus, the locative expression is under the scope of the causal expression. In fact it can be shown that stative locative expressions are base generated higher than causes.

Another motive for changing the base order is given by information packaging. A higher PP can be passed by a lower in order to put it into informational focus.

- (7) Wann hat Hans in Venedig gearbeitet?
When has Hans in Venice worked
When did Hans work in Venice?
- (8) Hans hat in Venedig am Montag gearbeitet.
Hans has in Venice on Monday worked
Hans worked on Monday in Venice.

In order for the temporal expression (am Montag) in example (3) to be understood as answer of question (2) it appears to the right of the locative, though base generated in a higher position.¹

Here is a short description of the thematic roles examined in Schweikert (2005). The roles appear in decreasing order from the highest (temporal) to the lowest (manner) followed by exemplifying PPs in German and English. For an exact definition see Schweikert (2005) but also Schweikert (2004).² For some neighbours an order could not be established. Therefore I inserted dashed lines between clear steps.

¹ Things are slightly different if the questioned element is taken from a list already mentioned in the discourse. So, if the question adds a list from which to choose, i.e.

Wann hat Hans in Venedig gearbeitet, Montag oder Freitag?
When did Hans work in Venice, Monday or Friday?

it is better to answer with the questioned constituent in situ:

Hans hat am Montag in Venedig gearbeitet.

² I renamed some of the thematic roles. So *Source Temporal 1* became *Elapsed Time of Ongoing Event*, *Source Temporal 2* became *Starting Point of Ongoing Event*, *Source Temporal 3* became *Starting Point of Closed Event*, *Duration 1* became *Secondary Duration*, *Duration 2* became *Telic Duration* and *Duration 3* became *Atelic Duration*.

Temporal		
	am Dienstag	on Tuesday
Starting Point of ongoing event	seit Dienstag	since Tuesday
Starting Point of closed event	ab Dienstag	from Tuesday on
Elapsed Time of ongoing event	seit drei Tage	for three days (now)
Atelic Duration	3 Tage lang	for three days

Locative		
	in Venedig	in Venice

Comitative		
	mit Franz	with Franz

Benefactive		
	für Franz	for Franz

Reason		
	wegen Schmerzen	because of pain

Directional Source		
	von Hamburg	from Hamburg

Telic Duration		
	in zwanzig Minuten	in twenty minutes
Secondary Duration	für drei Tage	for three days

Directional Goal		
	nach München	to Munich

Malefactive		
	gegen Fritz	against Fritz

Instrumental		
	mit einem Pinsel	with a paint brush
Means of Transport	mit der U-Bahn	with the subway

Path
durch den Fluss across the river

Matter
über Philosophie about philosophy

Manner
auf besondere Art in a special way

4. Setting the two hierarchies in relation to each other

In order to position the thematic roles with respect to Cinque's hierarchy of adverb classes some additional considerations have to be made. The usual tests that I applied for determining the PP order do not work here. The Quantifier Scope test requires both elements to be quantifiable, which is not the case for adverbs. Something like

- (9) * Er hat jedes vielleicht an mindestens einem Tag geschlafen
He has every maybe on at+least one day slept

is totally ungrammatical. The Pair List Reading test requires one element to be quantifiable and the other being able to be questioned. While the first condition is always available for the PP, the second is problematic for the adverb. The only possible question word is „wie“ (how), which is not specific enough and does not allow in all cases to be answered with the adverb in question:

- (10) Wie hat er an jedem Tag geschlafen?
How has he on every day slept
'How did he sleep on every day?'

The answer

- (11) Er schlief vielleicht an jedem Tag,

is not fully acceptable. And a list such as:

- (12) Er schlief vielleicht am Dienstag, sicherlich am Donnerstag und möglicher
weise am Freitag.

is very odd as an answer for semantic reasons. In addition the Pair List Reading test is only reliable in comparison to the partner sentence where the universal quantified element is exchanged with the question element. Since the adverb cannot be quantified this is not possible.

The Informational Focus is test also problematic because of the bad questioning properties of adverbs. But one can always question the PP and determine which po-

sitions in the Mittelfeld with respect to the adverb are available for the PP in the answer:

- (13) Wann hat er vielleicht geschlafen?
When has he maybe slept
When did he maybe sleep?
- (14) Er hat vielleicht am Montag geschlafen.
?? Er hat am Montag vielleicht geschlafen.

Though the question itself is not fully acceptable we encounter a sharp asymmetry in the answer. The second is far less acceptable. A close inspection, however, reveals that the sentence itself is problematic even in a context when it is not meant as an answer to a question. It is only possible when including high pitch to the main stress on the verb:

- (15) Hans hat am Montag vielleicht GESCHLA'FEN.
Hans has on Monday maybe slept
'On Monday Hans maybe slept.'

The interpretation of this sentence is

There was an event that took place on Monday. It is possible that this event was sleeping (Hans being the subject).

This observation puts us on the right track. The adverbs in this sentence takes only the verb in its narrow scope. The first sentence has the interpretation:

There is maybe an event of sleeping on Monday (Hans being the subject).

The adverb takes scope over the whole event, including the verb and the PP.

In order to examine this phenomenon in more detail a more complex example with three prepositional phrases is shown:

- (16) Hans hat es (das Buch) am Dienstag in Venedig mit einem Füller geschrieben.
Hans has it (the book) on Tuesday in Venice with a pen written
'Hans wrote it (the book) with a pen in Venice on Tuesday.'

Inserting the adverb "angeblich" (allegedly) in front of the first prepositional phrase we get:

- (17) Hans hat es angeblich am Dienstag in Venedig mit einem Füller geschrieben.

This sentence has two possible interpretations with respect to the scope of "angeblich". In the first case it has wide scope over the whole event:

Someone reported that Hans wrote the book with a pen in Venice on Tuesday.

In the second interpretation the adverb has only narrow scope over the immediate element to its right:

It is taken as fact that Hans wrote the book with a pen in Venice. Someone reported that this event has take place in Venice.

Interpretations which successively add constituents to the right of the temporal as being under the scope of the adverbial are also remotely possible:

It is taken as fact that Hans wrote the book with a pen. Someone reported that this event took place in Venice on Tuesday.

and

It is taken as fact that Hans wrote the book. Someone reported that this event took place in Venice on Tuesday using a pen.

If however, the adverb moves³ one constituent to the right as in:

(18) Hans hat es am Dienstag angeblich in Venedig mit einem Füller geschrieben.

only the interpretation with “in Venedig” under the narrow scope becomes available:

It is taken as fact that Hans wrote the book with a pen on Tuesday. Someone reported that this event took place in Venice.

No wider scope interpretation is possible. Moving the adverb across the next PP has a similar effect:

(19) Hans hat es am Dienstag in Venedig angeblich mit einem Füller geschrieben.

Here, also, we get only narrow scope of the adverb over the next constituent to its right:

It is taken as fact that Hans wrote the book in Venice on Tuesday. Someone reported that this event was done by means of a pen.

Moving the adverb further to the immediate position in front of the verb renders the sentence nearly ungrammatical:

(20) ??Hans hat es am Dienstag in Venedig mit einem Füller angeblich geschrieben.

The only interpretation is the one that takes the main verb in narrow scope:

It is given as a fact that there was an event of Hans doing something on Tuesday in Venice to the book. Someone reported that this “doing something” was writing (as opposed for instance to reading or signing).

³ Of course ‘moving’ is here just meant descriptively.

The deviation of the sentence is probably due to the specific semantics of the verb. If we take a verb for which it is more natural to be taken into narrow scope we get a fully acceptable sentence:

- (21) Hans hat sie (die Prüfung) am Dienstag in Venedig angeblich bestanden.
Hans has it (the exam) on Tuesday in Venice allegedly passed
Hans allegedly passed it in Venice on Tuesday.

(18) can have the implication that the speaker wanted to set the locative “in Venedig” in contrast to anything else which could be paraphrased as:

It is taken as a fact that Hans wrote the book with a pen on Tuesday. Someone reported that this event took place in Venice and not somewhere else.

This implication of contrast might lead to the assumption that the described phenomenon is more one of focus than scope. But note first, that the implied contrast is still under the scope of the adverb. We do not get the interpretation that it was Venice and not another (aforementioned) city in which Hans wrote the book with a pen on Tuesday and someone reported the whole fact. That Hans wrote the book with a pen in Venice is taken as fact. Only the place where this event took place is reported.

If it were a real contrastive focus we would expect sentence (18) to be possible as a correction of a sentence like:

- (22) Hans hat es am Dienstag in Padua mit einem Füller geschrieben.

But for me, (18) is not a possible correction of statement (22). The adverb “angeblich” would not be possible in this case. If I want to make a correction of the place and want to add the information that I have this information from hearsay, I have to express this fact with a more explicit paraphrase:

- (23) Aber ich habe gehört, Hans habe es (am Dienstag) in Venedig (mit einem Füller) geschrieben.
‘But I hear, Hans wrote it (with a pen) (on Tuesday) in Venice.’

Neither can (18) be interpreted as the answer to a constituent question such as:

- (24) Wo hat es Hans am Dienstag mit einem Füller geschrieben?
‘Where did Hans write it with a pen on Tuesday?’

This time it is possible to add the adverb “angeblich” to the answer but the position of the questioned constituent would be different from that in (18):

- (25) Hans hat es am Dienstag mit einem Füller angeblich in Venedig geschrieben.

For these reasons I continue to analyse the difference in interpretation of (17) – (20) as difference in scope of the adverb.

“Angeblich” is not the only adverb with these scope properties. In fact, this behaviour can be observed with all higher adverbs from “glücklicherweise” (fortu-

nately) to “freiwillig” (voluntarily) in combination with any of the above in section 3 listed prepositional groups. Here are the relevant examples for “freiwillig” including the possible interpretations:

- (26) Hans hat es freiwillig am Dienstag in Venedig mit einem Füller geschrieben.
'Hans voluntarily wrote it with a pen in Venice on Tuesday.'

with the possible interpretations:

- a) wide scope:

Hans voluntarily chose the whole act of writing the book with a pen in Venice on Tuesday

- b) salient narrow scope:

Hans wrote the book with the pen on Tuesday. He had a choice of date and voluntarily chose Tuesday, even if it was not the best day for him.

- c) less salient narrow scope readings:

Hans wrote the book with a pen on Tuesday. He had a choice of place and voluntarily chose Venice.

Hans wrote the book in Venice on Tuesday. He had a choice of instrument and voluntarily chose a pen.

- (27) ?Hans hat es am Dienstag freiwillig in Venedig mit einem Füller geschrieben.

only possible interpretation:

Hans wrote the book with a pen on Tuesday. He had a choice of place and voluntarily chose Venice.

- (28) Hans hat es am Dienstag in Venedig freiwillig mit einem Füller geschrieben.

only possible interpretation:

Hans wrote the book in Venice on Tuesday. He had a choice of instrument and voluntarily chose a pen.

- (29) ?Hans hat es am Dienstag in Venedig mit einem Füller freiwillig geschrieben.

only possible interpretation:

Hans performed an act with a pen in Venice on Tuesday which involved the book. Though the special act of writing had some disadvantages (cumbersome, took a long time etc.) he voluntary performed this special act.

Now compare this to the following sentences:

- (30) ??Hans hat oft seit letztem Jahr in Venedig mit einem Pinsel gemalt.
Hans has often since last year in Venice with a paint brush painted
'Often, since last year, Hans painted with a paint brush in Venice.'

This sentence sounds odd. The reason is not an incompatibility of the adverb with the source temporal prepositional expression. This can be verified by moving the adverb to the left.

(31) Hans hat seit letztem Jahr oft in Venedig mit einem Pinsel gemalt.

From our above experience we would expect that now only “in Venedig” is under the scope of the adverb. This interpretation is in fact available:

Starting from last year there were several events of Hans painting with a paint brush. Amongst those the number of events that took place in Venice is high.

Surprisingly, one also gets a wide scope interpretation:

Starting from last year there were several events of Hans painting with a paint brush in Venice. Their number is high compared to a contextual dependent standard.

Another narrow scope interpretation is also remotely available:

Starting from last year there were several events of Hans painting in Venice. Amongst those the number of events in which he used a paint brush is high.

If we move the adverb across the next prepositional phrase to the right

(32) Hans hat seit letztem Jahr in Venedig oft mit einem Pinsel gemalt.

we get only the narrow scope interpretation:

Starting from last year there were several events of Hans painting in Venice. Amongst those the number of events in which he used a paint brush is high.

Moving across the last PP gives the slightly degraded sentence

(33) ?Hans hat seit letztem Jahr in Venedig mit einem Pinsel oft gemalt.

Here I get only an interpretation with the verb in narrow scope:

Starting from last year there were several events in Venice featuring Hans using a paintbrush. Amongst those the number of events in which he painted is high.

The less acceptability of the sentence is probably due to pragmatic reasons since “painting” is the standard activity that one would do to a paintbrush and it seems strange to have it under these circumstances under the scope of “oft”.

If we abstract away from the leading source temporal we find the same behaviour as with the high adverbs together with a group of (lower) prepositions. And if we omit this problematic PP nothing changes with respect to scope properties. The problem seems to be this expression “seit letztem Jahr”. It belongs to the group of

source temporals, in particular to a thematic role that I called “Starting point of ongoing event”. Together with ordinary temporals this group forms the highest part of the hierarchy of thematic roles⁴. In Schweikert(2005) I was not able to establish an ordering relation amongst the members of this group, though there was some data that hinted that ordinary temporals were higher. Therefore, I want to have a look what happens if we exchange “seit letztem Jahr” with “im letzten Jahr”.

(34) ?Hans hat oft im letztem Jahr in Venedig mit einem Pinsel gemalt.

The sentence is better now and I can attribute to it the following interpretation:

*There are several events of Hans painting with a paint brush in Venice.
Amongst those was a great number which took place in the last year.*

Exchanging “seit letztem Jahr” with “im jetzten Jahr” in the sentences (31) – (33) does not change the relevant scope properties.

The following adverbs share this behaviour: “normalerweise” (usually), “wieder” (again), “mal eben schnell” (Cinque’s ‘quickly I’), “schon” (already), “nicht mehr” (no longer), “noch” (still), “immer” (always), “gerade” (just), “bald” (soon), “kurz” (briefly), “typischerweise” (typically), “beinahe” (nearly). If the adverb precedes a group of PPs of which the highest is a locative expression, we get ambiguity between wide and narrow scope interpretation as in the above case. If, however, a PP from the group ‘Temporal’ / ‘Starting Point of ongoing even’ / ‘Starting Point of closed event’ / ‘Elapsed Time of ongoing event’ / ‘Atelic Duration’ follows the adverb, the sentences becomes either degraded (up to being ungrammatical) or the only possible interpretation is a narrow scope interpretation. Here is another example, this time using the adverb “beinahe” (almost):

(35) Hans hat beinahe im letztem Jahr in Venedig mit einem Pinsel gemalt.

has the interpretation:

*It was almost last year, when Hans painted with a paint brush in Venice.*⁵

(36) Hans hat im letztem Jahr beinahe in Venedig mit einem Pinsel gemalt.

with the interpretations:

Last year Hans almost painted with a paint brush in Venice.

and

Last year Hans painted with a paint brush. He almost did this in Venice.

⁴ Evidential expressions with “gemäß” (according to) are actually even higher, but I do not consider them here.

⁵ Remotely possible seems to me in this case also a wide scope interpretation.

The lower adverbs like “völlig, komplett” (completely), “gut” (well), “schnell” (quickly II) and also “geschickt” (able) show yet another behaviour. They are all pretty bad if found in front of a PP and produce, in this case, a narrow scope interpretation. Found to the right of the PPs, however, the sentences are all grammatical.

- (37) Hans hat am Dienstag in Venedig gut gearbeitet.
Hans has on Tuesday in Venice well worked
'Hans worked well in Venice on Tuesday'

We get the only interpretation:

There was an event of working in Venice on Tuesday and this event was done in a good manner.

- (38) ?Hans hat gut am Dienstag in Venedig gearbeitet.

Here we get only a narrow scope interpretation:

Hans worked several times in Venice of which (only) the one done on Tuesday was done in a good manner.

- (39) ?Hans hat am Dienstag gut in Venedig gearbeitet.

The only possible interpretation is:

Hans worked in several places on Tuesday of which (only) the one in Venice was done in a good manner.

Cinque's hierarchy of adverbs can be subdivided into three different groups with respect to scope relations. The first group consists of all adverbs sitting in Mod_{volitional} or above. If we find them in front of any thematic role (temporal or lower, not evidentials) they are ambiguous between a wide scope and a narrow scope interpretation. If one PP of the kind under consideration is found to their left, they have only narrow scope over the constituent immediately to their right.

The second group – between prospective and habitual aspects – have the above behaviour with respect to locative and lower thematic roles. With higher thematic roles they show a different behaviour. If they precede these PPs they get only narrow scope interpretation and the sentence get slightly degraded down to ungrammatical.

The third group consists of the lowest part up to Mod_{ability}. All adverbs found here have their unmarked position to the right of all prepositional sentence modifiers. If we find them to the left of one, they take it into narrow scope and the sentence becomes less acceptable. Interestingly, this group constitutes exactly the adverbs that we find in English to the right of the verb (The fact that we find the adverb “geschickt” in this very low group is in favour of Cinque's own revision of the position of Mod_{permission/ability} which he assumes in Cinque(2004:133) to be between Asp_{Completive} and Asp_{prospective}).

I conclude from these observations that the position of temporal and source temporal is situated between Asp_{habitual} and $Mod_{\text{volitional}}$. The rest of the thematic roles from Manner to Locative are seated as a block between $Asp_{\text{completive}}$ and Asp_{habitual} .

5. A derivational approach

A generalisation that can be made immediately from the observations in section 4 is that an adverb takes wide scope over the whole event to its right and optionally narrow scope over each constituent to its right if the adverb and the elements to the right are in base order. If the adverb appears to the left of a higher PP or to the right of a lower PP it has in its (narrow) scope only the constituent immediately to its right.

To analyze this phenomenon in terms of syntactic structure and derivations is not an easy task. The first idea that comes to mind might be to analyze sentences in which the surface order mirrors the base order such as

(40) Hans hat es angeblich am Dienstag in Venedig mit einem Füller geschrieben.

or

(41) Hans hat seit letztem Jahr oft in Venedig mit einem Pinsel gemalt.

as being structures in which neither PP nor adverb has moved. All other sentences are derived from this base order by movement of the adverb. But this analysis is impossible for a sentence like:

(42) Hans hat es am Dienstag angeblich in Venedig mit einem Füller geschrieben.

or

(43) Hans hat es am Dienstag in Venedig angeblich mit einem Füller geschrieben.

A movement to the right would clearly correspond to a movement down the tree since the temporal is higher than the locative expression. This implicates that the trace would C-command the moved element and not vice versa. Movements of this type are excluded by most generative theories (Kayne 1994, Chomsky 1995). Furthermore, a movement of this kind does not explain the different behaviour of (40) and (42) with respect to scope. In (42) we would also expect a wide scope interpretation of the whole event to the right of the (moved) adverb.

Another idea that might come to mind would be to explain the observed word orders and their correspondent scope property with the particular semantics of the involved elements. Adverbs according to this theory are inserted freely in the structure in order to satisfy the scope properties. But this would not account for relationship of the availability of wide scope and the position of the adverb.

The fundamental question is: Why does the adverb take wide scope over everything to its right or alternatively narrow scope over each constituent to its right only

in a certain position? And moreover: Why does it take only narrow scope over its immediate constituent in any other position?

Usually it is assumed that an operator should C-command the elements in its scope at least at one point of the derivation. Or in other terms: it should either C-command the element itself or one of its traces. If we look at this from the other side this means that each element which by itself is C-commanded or whose trace is C-commanded by an operator can be interpreted as being under its scope. In order to take only the constituent immediately to its right into its scope the adverb has to C-command only this element at any step of the derivation. In the case of (42) or (43) this becomes a problem. We assume that the adverb “angeblich” is merged after the other three PPs – Instrumental, Locative and Temporal – are already inserted into the structure. This would usually mean that it C-commands the subtree it is merged to and thus all PPs individually and the whole event, independent on further movements. The only way to prevent this would be to first construct a constituent with the adverb deeply imbedded and then to merge this constituent to the rest of the tree. But then there would never be a landing position for a lower PP available, that is at the same time C-commanded by the adverb and C-commanding the trace of that PP. If my analysis of the scope properties of these adverbs is correct so far, C-command is not a possible relationship in order to establish the scope relation.

Kayne (2000) presented a different approach for operators as “only”, “even” or “too”. The basic idea is that the relevant operator is inserted in a head position higher as usually assumed and attracts a DP (e.g. an object) into its specifier. It is this head specifier relationship in which the scope of the operator over the DP is established (checked, licensed, assigned ... choose your favourite theory). Subsequent movements create the surface order. The important point in his analysis is that all movements are made before spell out. I want to exemplify this mechanism with one of his examples (Kayne 2000: 238f). The sentence to be derived is:

(44) John spoke only to Bill.

In Kayne’s analysis the prepositional expression “to Bill” is directly merged to the verb. The operator “only” is merged as a head afterwards. It attracts the PP to its specifier. After this, a light head “W” is merged and attracts the operator head. “Only” moves via head movement across the PP and adjoins to “W”. The rest of the VP is attracted to the specifier of “W”:

			spoke	to Bill
		only	spoke	to Bill
	to Bill _i	only	spoke	t _i
W	to Bill _i	only	spoke	t _i
W+only _j	to Bill t _j		spoke	t _i
spoke _k t _i	W+only _j	to Bill t _j		t _k

This proposal seems to me a promising approach to solve the scope riddle of German adverbs. There is, however, one difference between operators like “only” and the adverbs in Cinque’s hierarchy. As Cinque (1999) showed, these adverbs are not single heads. They are full XPs sitting in a specifier position. In order to accommodate this with Kayne’s theory I assume that the operator which attracts lower elements for scope reason is an empty category OP while the adverbs are sitting in the specifier of the W head. Attraction of other lower material to a position higher has to be attributed to other heads. (Or take the adverbs as sitting in an intermediate position between W and OP). A noticeable advantage is that there is no movement of the adverb from a lower position to W.

However, possible derivations become complicated. I present here one possible solution, starting with a derivation for the unmarked sentence

(45) Hans hat angeblich am Dienstag in Venedig mit einem Pinsel gemalt.

First, the full VP (shell) is constructed, including verb and object (I abstract away from the subject here). Then all three PPs are merged, first the Instrumental, then the Locative and last the Temporal. In the next step the empty operator head OP is merged and attracts the whole lower part. Now the whole constituent “am Dienstag in Venedig mit einem Pinsel gemalt” sits in its specifier and is thus under the scope of the adverb (“angeblich”) related to this operator. A phrase with the adverb in its specifier is merged last.

am Dienstag in Venedig mit einem Pinsel gemalt
OP am Dienstag in Venedig mit einem Pinsel gemalt
[am Dienstag in Venedig mit einem Pinsel gemalt]_i OP t_i
W [am Dienstag in Venedig mit einem Pinsel gemalt]_i OP t_i
angeblich [am Dienstag in Venedig mit einem Pinsel gemalt]_i OP t_i

As reported above, not only the whole constituent to the right “am Dienstag in Venedig mit einem Pinsel gemalt” can be interpreted as being under the scope, but also the highest subconstituent “am Dienstag” and marginally the lower subconstituents “in Venedig” und “mit einem Pinsel”. This resembles a case presented by Kayne (2000: 245) exemplified with the sentence:

(46) John gave Bill a book, too.

Here, the whole IP “John gave Bill a book”, the subject “John” and the indirect object “Bill” (and marginally “a book”) can be interpreted as being under scope of “too”. Kayne assumes that the whole IP moves into the specifier of the operator, “and IP or one of its subconstituents can be focused” (Kayne 200:246).

In analogy to this case we could account for the above ambiguity in the same way: the whole constituent and each of its subconstituents can be interpreted as being under the scope of the adverb.

If we want to relate different interpretations to different structures things become more complicated. For the interpretation with narrow scope only over the Instrumental “mit einem Pinsel” there has to be a landing site for the higher constituent “am Dienstag in Venedig” between the adverb and OP (I do not want to pursue this line in this work).

If the adverb is directly in front of the Instrumental only a narrow scope interpretation is possible:

(47) Hans hat am Dienstag in Venedig angeblich mit einem Pinsel gemalt.

It is expected therefore, to find just the Instrumental in the specifier of OP. Since the adverb is merged above all PPs but the Temporal and the Locative precede it in surface order they have to be moved across the adverb. One possibility is that they are moved individually out of specifier positions. In this case there have to be available landing sites for each overt constituent above the element under narrow scope. This is an option that seems difficult to extend to a universal theory. It seems to me more plausible that they move together as one constituent. But in this case they can move only as a remnant, since they select the lower material. The VP has to be moved out prior into a position between OP and the highest PP:

am Dienstag in Venedig mit einem Pinsel gemalt
[gemalt]_i am Dienstag in Venedig mit einem Pinsel t_i
[mit einem Pinsel t_i]_j OP [gemalt]_i am Dienstag in Venedig t_j
W [mit einem Pinsel t_i]_j OP [gemalt]_i am Dienstag in Venedig t_j
angeblich W [mit einem Pinsel t_i]_j OP [gemalt]_i am Dienstag in Venedig t_j
[am Dienstag in Venedig t_j]_kX angeblich W[mit einem Pinsel t_i]_jOP[gemalt]_i t_k

Now for the derivation of the unmarked sentence (31) which has an interpretation with the adverb “oft” taking wide scope over the final part “in Venedig mit einem Pinsel gemalt” as well as narrow scope over the individual parts of it.

(48) Hans hat seit letztem Jahr oft in Venedig mit einem Pinsel gemalt.

Here first the VP with the two lower PPs is constructed. Then the operator OP is merged and attracts the whole lower constituent into its specifier. The adverb follows (in a specifier of a higher empty head) and finally the merge of the higher (source) temporal PP:

in Venedig mit einem Pinsel gemalt
OP [in Venedig mit einem Pinsel gemalt]
[in Venedig mit einem Pinsel gemalt]_i OP t_j
W [in Venedig mit einem Pinsel gemalt]_i OP t_j
oft W [in Venedig mit einem Pinsel gemalt]_i OP t_j
seit letztem Jahr oft W [in Venedig mit einem Pinsel gemalt]_i OP t_j

Sentences where the adverb is in front of a PP that is inserted into the structure after the adverb as in sentence (49) provide the most problematic cases and the least acceptable sentences.

(49) ?Hans hat oft im letztem Jahr in Venedig mit einem Pinsel gemalt.

The adverb and its operator have to move across the higher adverb to the left before they can attract the Temporal. The easiest way to do this is to assume that the operator itself can be freely merged into the structure any time. In this case the single constituents VP, Instrumental, Locative, Adverb and Temporal are merged one after the other. Then the operator is merged and attracts the Temporal. Since the operator must be licensed by the adverb, the latter must move to a higher specifier in front of the Temporal-OP complex:

im letztem Jahr oft in Venedig mit einem Pinsel gemalt
OP im letztem Jahr oft in Venedig mit einem Pinsel gemalt
[im letztem Jahr]_i OP t_i oft in Venedig mit einem Pinsel gemalt
W [im letztem Jahr]_i OP t_i oft in Venedig mit einem Pinsel gemalt
[oft]_j W [im letztem Jahr]_i OP t_i t_j in Venedig mit einem Pinsel gemalt

This derivation shows more movements than are usually found in minimalist theories. This might be surprising at first but the presented data shows (as do many other results of linguistic research) that sentences of human language are interpreted in a highly complex manner which is related intimately with their syntactic structure.

6. Conclusions

I have shown that scope properties of adverbs with respect to sentence modifying PPs give rise to a subdivision of the Cinque hierarchy of adverbs into three groups which are separated by two blocks of thematic roles. Thus the position of these roles can finally be situated with respect to adverbs resulting in the following combined hierarchy⁶:

MoodP_{speech act} > MoodP_{evaluative} > MoodP_{evidential} > ModP_{epistemic} > TP(Past) > TP(Future) > MoodP_{irrealis} > ModP_{alethic} > Temporal / Starting Point of ongoing event / Starting Point of closed event / Elapsed Time of ongoing event / Atelic Duration > AspP_{habitual} > AspP_{repetitive(I)} > AspP_{frequentative(I)} > ModP_{volitional} AspP_{celereative(I)} > TP(Anterior) > AspP_{terminative} > AspP_{continuative} > AspP_{proximative} > AspP_{durative} > AspP_{generic/progressive} > AspP_{prospective} > Locative > Comitative > Benefactive > Reason > Source > Telic Duration /

⁶ The order of adverbs is based on Cinque (2004: 133).

Secondary Duration > Goal > Malefactive > Instrumental / Means / Path > Matter > Manner > ModP_{obligation} / ModP_{permission&abilitz} > AspP_{Completive} > VoiceP > AspP_{celerative(II)} > AspP_{repetitive(II)} > AspP_{frequentative(II)}

Whether the temporal roles are really below MoodP_{irrealis} and ModP_{alethic} or not better in the same position as TP(Past) or TP(Future) should be examined in more detail. The exact position of the three durative roles is also worthy of additional research.

Comparing the above hierarchy with adverb positions in English gives another interesting result. The adverbs of group III which are lower than all modifying PPs coincide with those that are found in English to the right of the verb. For these reasons I conclude that the verb even in English is not in its base position but instead has moved across the lower adverbs of group III and the PPs. If we add the hypothesis that by doing this it pied pipes the crossed PPs we get an explanation for the fact that the unmarked order for these prepositional modifiers is the reversed one behind the verb.

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